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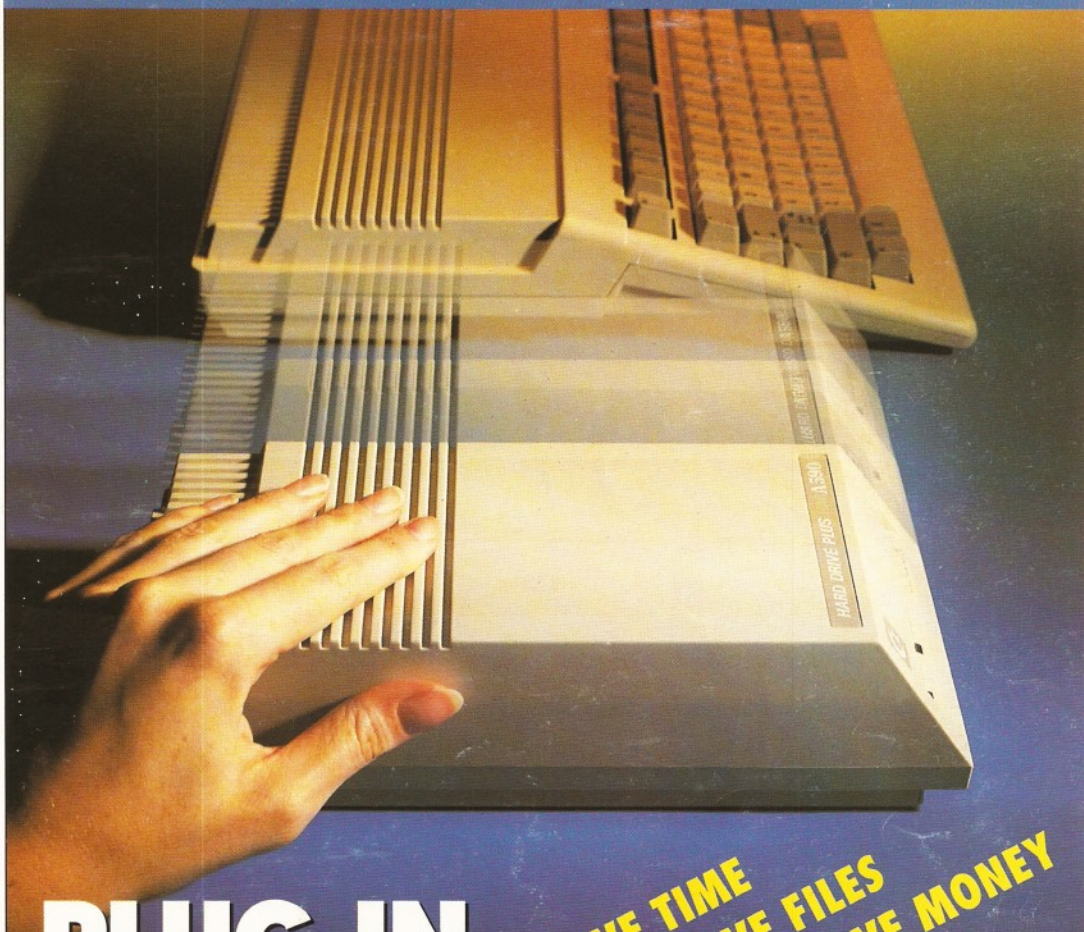
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ISSUE 1 ● MAY 1991 ● THE MAGAZINE FOR AMIGA BUYERS

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WHAT'S IN STORE

AMIGA SHOPPER

SHOPPING LIST

This is an alphabetically arranged, quick reference list to everything in the issue. Just look for the relevant name of the software, hardware or subject heading and it should be in this list. Some things are cross-referenced under more than one heading so you should have no trouble finding what you're after.

WHO ARE WE?

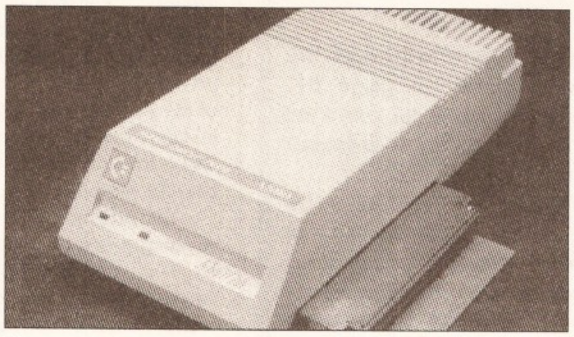
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FEATURES



Save time, save files, save money with a hard drive.

REVIEWS

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AMIGA SHOPPER GETS SERIOUS

Welcome to the first full issue of *Amiga Shopper* – the magazine that's as serious about your Amiga as you are. Many of you will have seen the sneak preview issue that was given away with issue 21 of our sister magazine *Amiga Format*. For those that are coming to *Amiga Shopper* for the first time, we should explain what's so special about yet another Amiga magazine.

Amiga Shopper **is totally dedicated to the serious side of the Amiga and completely excludes games, except to refer to them in terms of their programming. We've launched it because that's what you were crying out for – a magazine, with no games coverage, that took the Amiga as seriously as you do and could provide the sort of in-depth back-up and information you need to get the very best out of your Amiga.**

The team behind *AS* knows what it is talking about too, although it certainly doesn't know everything. Bob Wade, the editor, was in charge of *Amiga Format* for 18 months before launching *AS* and knows the Amiga scene and what you want from a magazine. The three consultant editors Mark Smiddy, Phil South and Jeff Walker are all highly regarded Amiga experts, all with great experience, and know how to pass on their knowledge to you. Add to that an experienced team of writers – all specialists in their fields – and you have a team that can give you absolutelym everything you need for your Amiga.

Every month we will be doing major comparison features on hardware and software to help you make the right buying decisions. Already we have done floppy and hard disk drives in the preview issue and this issue respectively, and in the next three we will be covering 2D paint programs, accelerator cards and mono printers. As these comparisons are completed they will be repeated on a rota basis in the form of the buyers' guide – you will find the floppy drives' guide on page 97. These will be changed as often as necessary to include new releases and updates.

Of course, we will also be reviewing every new piece of hardware and software as it comes out, but not in the flimsy manner you might be used to from other magazines. When we review something, it is put in the hands of a specialist in that area and then tested long and hard until we're sure we've got it right. You may not always see it reviewed here first, but you will always find it reviewed here best.

As well as reviews, we are committed to providing you with the best tips and tutorials to help you get the most out of your Amiga. We will be running regular tutorials on the various programming languages, individual programs and more general techniques as well. When it comes to tips and solving problems, you will not find a better place to come because, as well as giving tips within each specialist column and review, we will be solving virtually any problem you can throw at us through our Amiga Answers pages.

If all this sounds too good to be true for just 99p an issue, then notice the fact that we have cut our production costs right back by not using any colour on the editorial pages. We are not interested in looking glossy, just in providing the maximum amount of useful information as clearly as possible.

These are the goals we have set ourselves and we will be striving to meet them. If you think we fall short at any stage then we want to here about it so we can do something about it. Or if you think we've got it just right, we would all be chuffed to get a pat on the back. Whatever your view, we want to hear it. So why not let us know what you think by writing to: Bob Wade, *Amiga Shopper*, 30 Monmouth Street, Bath BA1 2BW.

VISTA FROM AN

by Mark Smiddy

Virtual Reality's much vaunted *Vista* landscape generator has received a welcome upgrade in the form of the stunning new *Vista Pro*, which includes support for 24-bit frame buffering, giving over 16 million colours.

The original *Vista* was a stunning piece of software in its own right, but this latest version takes it into a new world. A host of new features has been incorporated in the package, including support for high-res, interlace and overscan screen modes. Phong shading has been replaced with the more realistic Gouraud technique and it has had infinite light control added.

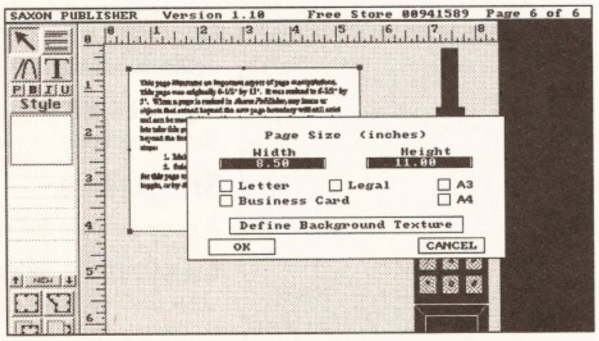
Another welcome addition is the animation script control, enabling the generation of progressive landscapes without user intervention. Using this, it is claimed *Vista* could be used to create stunning transformations, such as the 'Genesis effect' seen in *Star Trek II, the Wrath of Khan*. However, 3D ray-tracing freaks will be pleased to know the program still exports to *Turbo Silver*.

On the cards for later this year are *Vista 2* and *Vista Pro 2*. These have even more impressive features such as trees and even realistic river tracking. These help you define the start of flow and the *Vista* will calculate the path of the river – even accounting for variations in the geological detritus (rocks and stuff).

Included with the program are pre-defined scenes of Mt St Helens before and after the 1980 eruption; Half Dome and El Capitain from Yosemite National Park; Crater Lake and the Calera

ANGLO SAXON

by Phil South



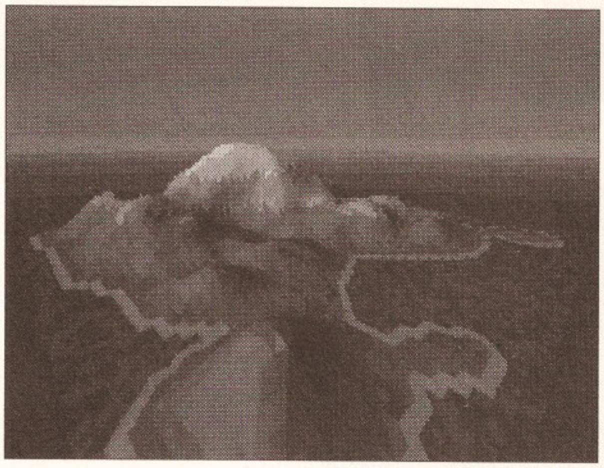
***Saxon Publisher*, the latest contender in the DTP stakes.**

A new contender in the DTP battle is *Saxon Publisher* from Saxon Industries. The program features full PostScript output, and a great many features not found in any other Amiga DTP package, such as the ability to skew bitmaps and text to interesting angles.

The program works in an original way, more like *Ventura* on the PC than the usual run of intuitive, graphically and mouse-driven Amiga programs, but is surprisingly easy to use. Most pieces of text and graphics are tagged and styles are chosen for them from a requester rather than the usual highlight and choose methods employed in the more mainstream programs like *Pro Page* 2.0.

The program works in everything from a 1Mb Amiga, and comes on just one thin disk. *Saxon Publisher* costs £249.95 and is available in the UK from Surface UK.
Surface UK
☎ 081 566 6677

OTHER PLANET



Owners of big RAMs will be able to get spectacularly lost in Virtual Reality's vaunted *Vista* landscape generator.

area of Mars – this truly is a *Vista* from another planet. In case you ever get bored with those, *Vista* boasts four billion fractal landscapes and extra scenery disks with over 150 new scenes.

At £99.95, *Vista Pro* sounds like a cost-effective land of fun – but the bad news is it needs at least 3Mb to run and 3.5Mb for full features. The original *Vista* software (which only needs a measly 1Mb) is still available at £59.95.

HB Marketing
☎ 0753 686000

WHO ARE YOU?

So what do you use your Amiga for? Don't be shy, we would like to know. If you are using it in a professional capacity, as part of an interesting hobby or in some unusual capacity then why not tell everyone else about it – it could be the start of something big. You can either write your own self-profile or we might be persuaded to drop in on you and have a chat ourselves. We are particularly interested in profiles that will give other Amiga owners bright ideas for things they too can do. Send your words to: I Want to be Famous, Amiga Shopper, *30 Monmouth Street, Bath BA1 2BW.*

THE CDTV DEVELOPERS

Conference report

As *Amiga Shopper* was going to press, a group of the most influential Amiga developers gathered at a secret location in Maidenhead to hear the latest movements on the CDTV scene

Developer liaison manager Sharon Rodrigo took the floor and the expectant audience – numbering almost 90 – awaited news with keen anticipation. After a brief welcome, the first of the speakers, On-line's Clement Chambers, was introduced to demonstrate the company's DUNE system.



On-Line chief, Clement Chambers had bad news for CDTV programmers .

Chambers keenly pointed out how DUNE could help with the creation of complete packages without the need for programmers. Anyone, he noted, can use DUNE – from the MD downwards – avoiding the situation in which programmers hold a company to ransom by threatening to leave part way through a project. This gained a mixed reaction from the crowd which contained, among others, members of Jez San's highly respected Argonaut team.

By contrast, Ariadne's David Parkinson showed how their ELK system could allow programmers to create software with the minimum of time and effort. This revealed the cross-section of those attending, as Parkinson went on to describe the programmer-friendly resource management employed in ELK – glancing around, he commented: "I can see some eyes glazing over".

Unfortunately, most of what was on show was for "developer's eyes only" and cannot be reported as of yet. A release date is said to be imminent – backed up by Gail Wellington's (Commodore's head of special projects and the guiding force behind CDTV) comment via satellite, "I think we are giving birth to a baby elephant..."

Nevertheless, from what this observer saw, when CDTV does arrive it will almost certainly have a software base unrivalled in the history of computer launches. For instance, a representative from British Telecom was spotted, aiding speculation that the whole UK telephone directory may soon appear on CD-ROM – at a realistic consumer price. This has got to be good news for everyone – not only does it mean potential buyers will be treated to a machine with a future, but also the developments are bound to influence and improve standard Amiga software.

Interestingly too, Commodore has estimated the price point for complete development systems will start from as little as £3,000 excluding VAT. Compared to rival systems, such as CD-I, this is very cost-effective and has the added bonus that applications can be developed for the CDTV and Amiga on the same system.

● This report was compiled for *Amiga Shopper* by a registered (working) CDTV developer and with the approval of Commodore UK.

HYPERMEDIA? CAN DO

by Phil South

Checkmate Digital has announced it is to be the sole UK distributor of the *CanDo* hypermedia authoring system from Inovatronics. This system was previously only available in the US and on import in the UK. Checkmate will be fully supporting the program, and indeed all Inovatronics programs such as the amazing *HyperHelpers*.

Checkmate is also starting a *CanDo* PD library for contributions from UK users. The program is capable of helping create just about any Amiga application using a simple icon and requester format, so products on this PD library should be something to behold. The best submission they get every week will receive a *CanDo* T-Shirt. All that you have to do is to send in a program along with a photocopy of your invoice to act as proof of purchase. For further details why not phone up the *CanDo* PD Library on 081 204 3954.

***CanDo* 1.22 costs just £125 normally, but until the new version 1.5 comes out the program will be priced at an introductory £99. *HyperHelpers*, containing online AmigaDOS help and lots of other Hypertext style utilities, is also on sale at £49.**

Checkmate Digital ☎ 071 923 0658
Inovatronics ☎ 0101 214 340 4991

SO WHAT'S THE STORY?

If you have a news story that all Amiga owners ought to know about, make sure you tell us about it, because if you don't tell us then we can't tell everyone else. What's newsworthy? Well, how about new hardware, new software, shows, services, overseas markets, Amigas in odd places, unusual uses for the Amiga, famous Amiga users, major achievements and disasters caused by the Amiga, bankruptcies, new companies and anything else you think would be of relevance or interest to Amiga owners. Write to: Shock Horror Probe, *Amiga Shopper*, 30 Monmouth Street, Bath BA1 2BW or FAX us on 0225 446019.

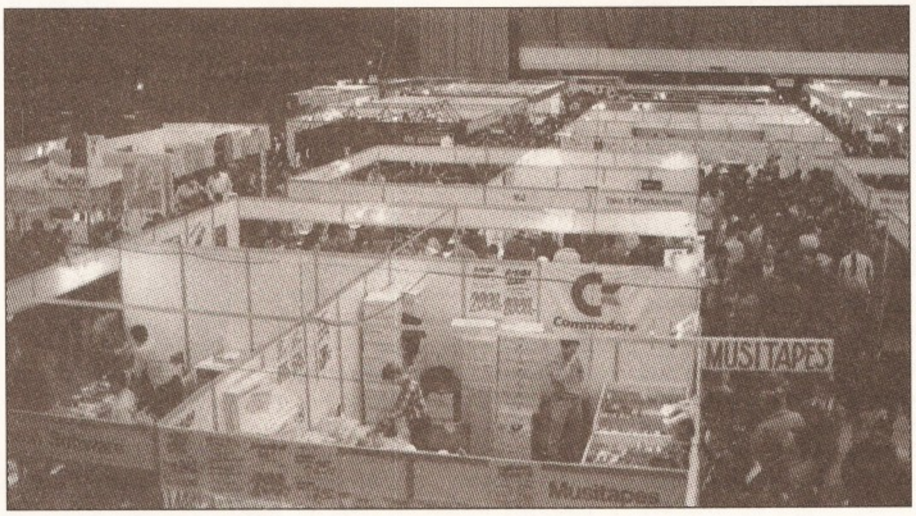
AMIGA WORLD BENELUX SHOW

Show Report by Peter Jones in Belgium

The Evenementenhal in Eindhoven boasts exhibition space of around 3,000 square metres, which seemed ample for the Amiga World Benelux show. The trouble was that it was also the Atari Expo Benelux AND the PC Show Benelux. This meant that of the 95 stands in the hall, only about 30 of them were showing Amiga-related products.

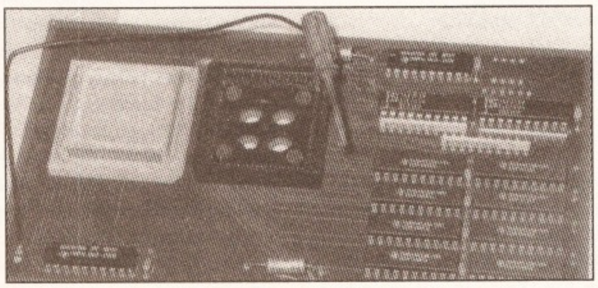
The hall was split into three areas, with the Amiga and Atari getting about the same amount of space, and the PC, somewhat surprisingly, rather less. Charles van der Linden, of Inter Expo & Media, the show organiser, said attendance on the Friday was very good, with around 8,000 people passing through the turnstiles, and that he expected a total attendance of around 30,000. He added that the next show (20-22 September) will be held in the Beursgebouw, an exhibition centre currently under construction in the centre of Eindhoven. It will have three halls, each of 3,000 square metres, one for each computer.

Dealer reaction was mixed. Nigel Chandler, of Connect International, said that although he had probably covered the cost of the three-day show on the Friday, given that the charge of the stand was only a fifth of what it would be in the UK, his stock of mainly games software was not moving very fast.



Belgian shows obviously look just like British ones – but this one had no launches.

On the other hand, Paul Burgess, of Precision Software was very satisfied with sales – Precision, as always, specialising mainly in 'serious' applications. Paul Share, managing director of a local company U.S. Action, said business had been so good on the first day that he had had to close down his shop and bring all of his staff to work on the stand at the show.



The Pulsar card that gives you 2 Meg of chip memory

Commodore Nether-lands was absent, as were most of the leading German Amiga specialists, with the exception of Rossmueller Inc which was showing a range of hardware add-ons, including the Turbo-XT card at 498 guilders; the Megadrive 1.52Mb floppy at 329 guilders, and the Vortex ATonce PC-card at 449 guilders.

One local dealer bemoaned the fact that although he was offering games packages at anything from 40 to 55 per cent off the list price, they were not selling. "It's always the same," he said, "a youngster will come up to the stand, look at the what's on offer, say 'got it, got it, got it' and then ask for a game that's hardly out of the programmer's hands. What he means by 'got it', is that he has a pirated copy. Piracy is a way of life in the Netherlands. We were pirates in the past, and we still are today."

Max Barber, editor of the recently launched Hoog Spel, a full colour Dutch-language games magazine, was also present. He said that the 20-odd computer magazines in the Netherlands were all boring, both in layout and content. Personal Computer Magazine, Dutch sister of Personal Computer World, came in for special mention in this context. He felt that his readership would come from all the young games players looking for a 'serious' games' magazine.

Sultan Systems of Rotterdam displayed a card from Pulsar that gives an Amiga 2000 two Megabytes of chip memory, like the 3000. No other details or prices were available, but advertisements in the States for something similar put the price at a whopping $329 (£160), although there is an unspecified buy-back price for the fatter Agnus chip which the card replaces.

On the professional side, Take 1 Productions of Heerlen, was demonstrating the multimedia qualities of the Amiga 3000, including a demo program using a Microtouch touch-sensitive screen. Paul Heimbach of

THE POWER AND THE FORMAT

We don't have any truck with those game things round here, but if you're looking for some light entertainment in between stretching your Amiga to its limits, then why not take a peek at our two sister magazines, *Amiga Format* and *Amiga Power*. *Amiga Format* covers all areas of the Amiga and comes with a cover-mounted disk every month, containing playable game demos and other useful programs, and costs £2.95. *Amiga Power* is another new magazine from the Future Publishing stable and is full colour and totally dedicated to games. It also comes with a covermounted disk containing a full game and demos and costs £2.95.

Watch out for *Amiga Format* hitting the streets on April 11 with a preview of *Amiga Power* attached. The first issue of *Amiga Power* comes out on April 25.

AEROBICISE YOUR EYES

Aerobic Glasses are the latest idea for coping with eye strain caused by sitting in front of computer monitors. They are supposed to be worn for a maximum of 20 minutes a day and assist focusing and limit eye strain. We're getting hold of some to test out in the office, but you can find out more from the suppliers Larkhall Natural Health who sell the specs for £27 or £42 including an eye exercise chart and an information book.

Larkhall Natural Health ☎ 081-874 1130

Take 1, said the company has recently provided some 70 information terminals at Jazz Mecca, the big Jazz festival in Maastrich, Holland. The company is almost entirely Amiga based, he added.

The Amiga World Benelux was rather disappointing. It had neither the size nor the variety of exhibitors of a British or German show and was rather spoiled by having to share a hall with both the Atari and the PC. Inter Expo & Media are going to have to try rather harder if they are to improve significantly for the next show at the end of September.

CHECKOUT

Launches.........0/20
Not at this show.

Bargains.......12/20
There to be had, but see comments on piracy.

Venue...........20/20
Very simple to get to: leave the motorway, head for the centre of Eindhoven, left at the football stadium. Good temperature in the hall and very easy to get around.

Facilities........12/20
Only one set of toilets, though these were clean (the Gents, at least!). Small snack bar/restaurant with a long queue during the lunch period. Prices reasonable by Dutch standards.

Stands..........20/20
With a few exceptions (Rossmueller, TDK) the stands all had a counter, two sides and a back and goods were advertised on large sheets of white paper with marker pens.

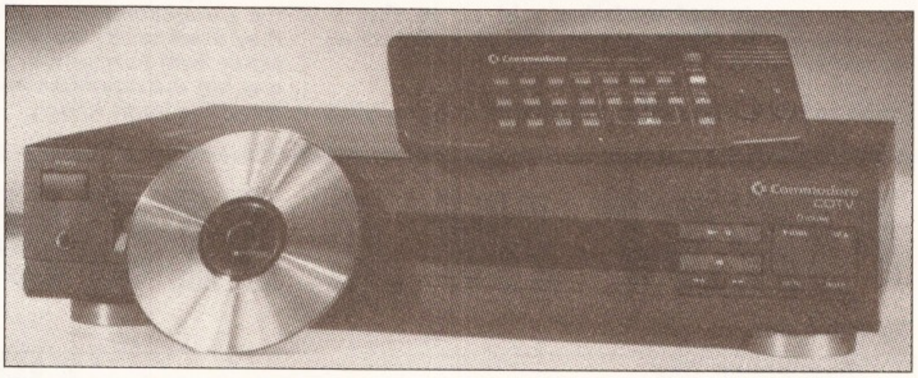
Overall.......64/100

STAND AND BE PRINTED

Contriver has come up with the Printer Pak which you can place your printer on, allowing the paper to be stored underneath. The Pak also contains a cable and over 100 yards of paper. The Pak costs £19.99, or you can get just the stand for £14.99.
Contriver ☎ 0280 822803

OPINION

The opinion column is open to anyone for comment on aspects of the Amiga scene about which they feel strongly. This month Terry Cox, a CDTV developer, shares his view of the future of the Amiga-based entertainment system.



What awaits the CDTV and its users in the near, and far, future? Terry Cox speculates.

I want to take you on a journey, a journey to the future. Your future. We are in your living room. It feels familiar. There are many things here that you recognise. You have a new Hi-Fi. You sit in your favourite armchair, pick up the remote from the coffee table and turn on the TV. A presenter is reading the news. As he talks, his voice issues from the hi-fi speakers in stereo. You flip through the channels briefly, then look around the room. On the table is a CD with the word 'Welcome' printed on it. You place it in the player. A man's voice says: "Welcome. If you are unfamiliar with the equipment, please allow me to guide you."

On the TV, a picture has appeared. A number of images and some text. The man speaks again.

"What is your interest today? Please use the remote to make your selection."

The heading 'Modern History' catches your eye and, using arrow keys on the remote, you select it. The screen changes and the voice speaks: "Modern history, which period?"

Seeing the phrase 'Current Day', you select it, hoping to learn more. The screen changes to a time line which quickly slides to its right hand end and fades to create a new picture.

"This is the age of Information Technology. The sum total of man's knowledge doubles every three to four years. The linear storage concept of the mass-produced 'book', which was first invented in the 16th century, was realised to be highly restrictive to the education process and much effort was devoted to the development of machines to assist in storage and learning."

As the voice speaks, so the words are echoed on the screen and, in one corner, a video plays showing a range of computers. Fiddling with the remote, you discover that certain words in the text can be highlighted. You select the word 'Learning'. The screen fades to reveal a list of education-related subjects. Flicking aimlessly, you select 'Educational Psychology'. An official looking report appears and now a different voice speaks.

"Of paramount importance in the process of education is the retention factor – the amount of information actually remembered following a learning session. There are many factors affecting this process, but one of the most significant is the degree of interest or otherwise that the student has in the material. It is unfortunately true that any subject matter can be considered a lost cause if its standard of presentation is not up to scratch. It takes a well written book to drag attention away from the television or a video game.

"As always, however, technology comes to the rescue in the form of 'interactive multimedia'. This allows the presentation of information as a combination of text, pictures, video, speech, music and other sounds within a tool, that allow the student to explore the material in the manner of his or her choice. It is this flexibility that is the underlying power of the system. No two people will have exactly the same point of view and so will approach a subject from differing angles. A multimedia tool allows that person to study the material in the form that he or she sees best."

Here is the key that you are looking for and instinctively you move to call up further information on this 'Multimedia Tool'. This time, the speaker is a woman.

"Interactive Multimedia is probably the most important creation of the 20th century. Just as the invention of the movable-type printing press in the early 1500s allowed the common man access to a wealth of knowledge previously only available to church and state, thus precipitating the Renaissance, so cheap multimedia machines will be the basis for a 21st century renaissance as people react to the huge pool of human knowledge now available to them. Such is the scope of this information that the latest machines are being designed with integral Artificial Intelligence systems, which learn the preferred forms of information and areas of interest to their users and automatically format the data in the most easily digestible form."

We must return you to the present now, but as we depart, your eye is caught by a newspaper headline under the coffee table. The date on the paper is April, 1991, the headline reads "Commodore releases CDTV".

BLITS & BOBS

One Compact Disc can store 650Mb of data; That is roughly 250,000 pages of text or a pile of paper 36 feet high. Storing the data on CD saves 8 whole trees.

DIARY DATES

Here's a list of forthcoming shows and events that may be of interest. If you want something to be featured here, just send us brief details of your event and we will print them here. Send your info to: Diary Dates, *Amiga Shopper*, 30 Monmouth Street, Bath BA1 2BW.

APRIL 21
All Formats Computer Fair. The National Motorcycle Museum, Solihull, West Midlands. John Riding ☎ 0225 868100

APRIL 23-26
Which Computer? Show. NEC, Birmingham. Reed Exhibitions ☎ 081 948 9800

APRIL 26-28
MIDI Music Show. Novotel, Hammersmith, London. Westminster Exhibitions ☎ 081 549 3444

MAY 10-12
Spring Computer Shopper Show. Alexandra Palace, London. Blenheim Database Exhibitions ☎ 081 868 4466

MAY 21-23
CD-ROM Show. Novotel, Hammersmith, London. Agestream ☎ 0733 60535

June 25-27
Multimedia '91. Olympia 2, London. Blenheim Online ☎ 081 868 4466

WOT, NO AMIGA SHOPPER?

If you had any trouble getting hold of this issue of *Amiga Shopper*, then first go and ask your newsagent if they have it in stock – and if not why not? Then give them a copy of the form on page 94 reserving a copy of the mag. Then phone the ever helpful Kate Hodges in our circulation department on 0225 442244 and tell her the name and address of the shop(s) where you could not get *AS*, and we will try to ensure that in future you get hold of the mag.



OPINION

byBob Wade

A great deal of the software and hardware for the Amiga originates in the USA and is imported to the UK by distributors and other third parties. This leads to two extremely annoying occurrences that ought to be dealt with:

1. Magazines just printing the US phone number for a company and expecting readers to go through the time and expense of contacting them themselves to sort out prices, availability, etc.

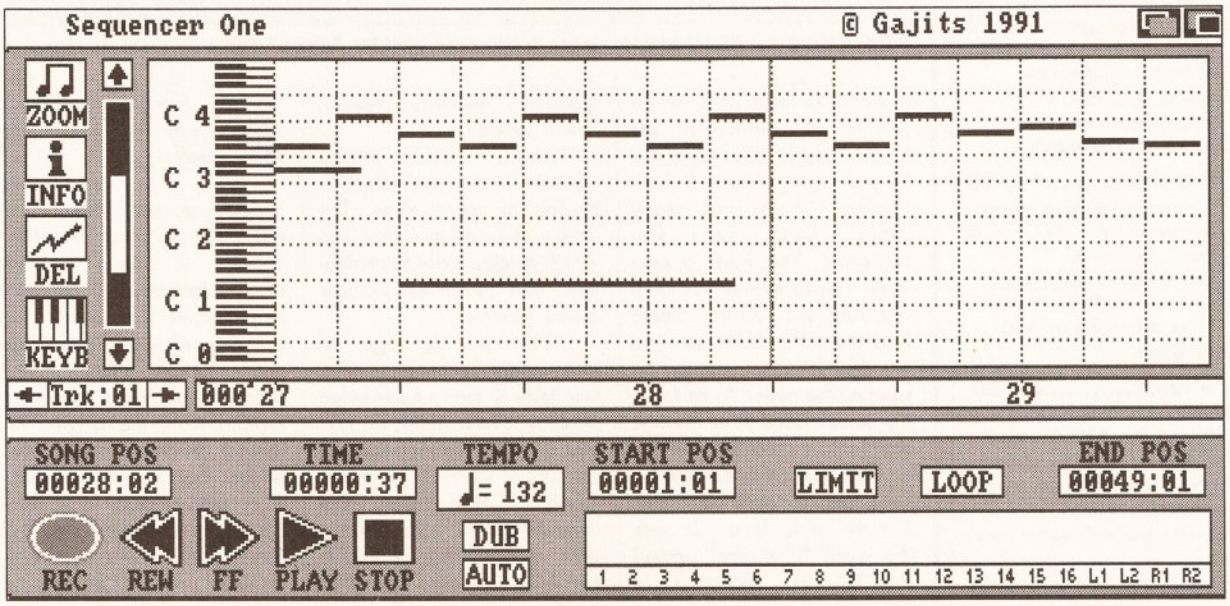
2. The extraordinarily high prices that certain imported goods end up being sold at, so that it would in fact be cheaper to buy things in the US or the rest of Europe.

I can't speak for any other magazines in remedying point one, but I do know that in *AS* we will be, wherever possible, providing you with contact numbers in both the UK and the US. If there isn't a UK distributor we will let you know. It seems to me that any other attitude is sheer laziness and a failure to look out for your interests.

As for point two, it's a thorny subject that, distributors will rightly tell you, is down to import duties (as you will know if you've ever tried bringing stuff in by mail) and the relatively small size of the UK market in comparison to the US or rest of Europe as a whole. However, the UK Amiga base is growing at a rapid rate and the excuses for the differentiation in pricing are not as strong as they used to be. We will be keeping a close eye on prices both here and in the US and if you encounter any big discrepancies you think ought to be looked into, then let us know.

FIRST IN A SEQUENCE

by Jon Bates



Sequencer One **is the new sequencing program from Gajits and comes with a composition system, *The Hit Kit.***

Gajits, which must be one of the very few UK software houses creating Amiga music software, is finally launching Sequencer One *for all Amiga models. There are 32 Tracks for recording MIDI data, with graphic editing displays and a passive cue sheet. All tracks can be named and sound changes are set up from the main page instead of diving into a complex data-stream editing procedure.*

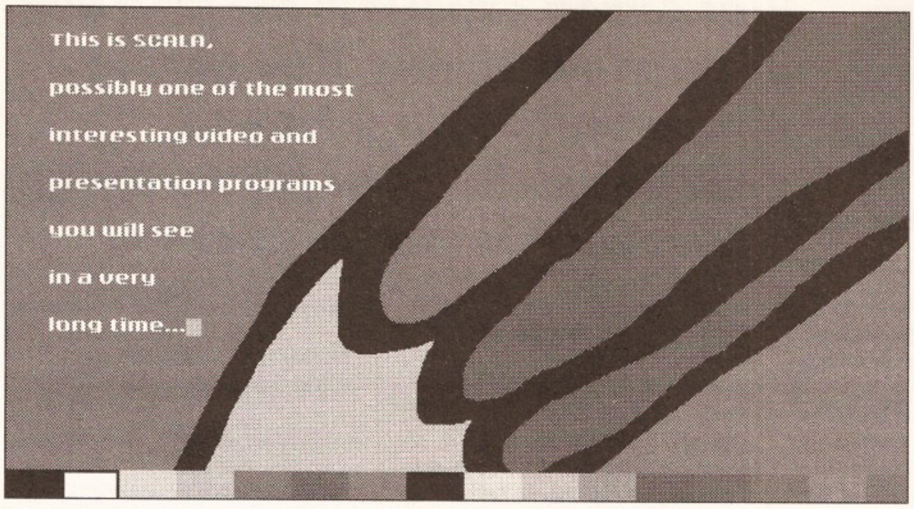
A Block page takes care of overall song construction with macro cut and paste facilities, and all songs can be stored in both MIDI file formats. Sequencer One *has full synchronization specs which enable it to run with any external devices and it supports IFF sample play on four channels in stereo thus giving the possibility of 20 channels of separately controllable sound; a visible track activity display shows which tracks are working at any time.*

As well as 32 tracks, there are section markers enabling overdub or automatically going over sections as you record or apply any correction to the section thus defined. All the transport icons are very simple and easy to understand.

Notes can also be entered from an on-screen keyboard and there are facilities to thin out unwanted MIDI data either before or after recording, as well as the usual quantize timing correction which has the ability to transpose and shift whole tracks in time – useful for creating echo effects or thickening up sounds.

The program will come with a free bonus of The Hit Kit*, a music composition system. It multi-tasks with other Amiga music software, including their own Roland voice programmers and will cost £89. Gajits offers a helpline service and there are plans to extend this to a library of sounds and song files. Expect a full review soon.*
Gajits ☎ 061 236 2515

WHAT'S ON AT THE SCALA?



The screen caption promises much and we will see if *Scala* delivers next month.

Scala is a new presentation package from Digital Vision Software Design Group, which pushes back the boundaries of quality you can expect from presentations. The program combines the ease of use of an authoring package, with the quality of a broadcast quality titling package. And all this for £249, which, for the spec isn't at all bad. Silica is the UK distributor. Amiga Shopper will be running a full review soon.

Silica Distribution Ltd ☎ 081 309 1111.

CLOSE TO THE EDIT

Syntronix should be a familiar name to anyone in the field of Amiga video work and the company has just launched its Amiga Editing System. The system uses the Amiga to become the editing control console and provides editing facilities between two VCRs. Assembly and insert editing can be done in manual or automatic modes, IFF files can be pulled in as part of an editing sequence and timecode is unnecessary because you can achieve frame accuracy in the manual mode. The system costs £499.95 excluding VAT, but you may still be able to take advantage of Syntronix's special introductory offer of £299 – phone for details and say that *AS* sent you.

Syntronix also produces an RGB Recording System and an RGB Splitter (£249.95 and £199.95 respectively – both excluding VAT). The Recording System is an alternative to a conventional genlock, allowing graphics and animation to be recorded on to videotape, while the Splitter eliminates the need for the old black and white camera with those annoying colour wheels and can grab pictures from any VCR that has a high quality 'still frame' function.

Syntronix ☎ 0332 298422

YOU'VE ALL DONE JOLLY WELL!

The European Computer Trade Show on April 14-16 is again the stage for the European Computer Leisure Awards. Although these are mostly games related, there are a number of categories in which the Amiga and Amiga software and hardware are vying for honours. The Amiga 500 has again been nominated as Home Computer of the Year – a title it picked up last year. Commodore's AmigaVision, for creating multimedia presentations, has been put forward for the Multimedia Package award, while Newtek's Video Toaster, Vortex's ATOnce card and Datel's Action Replay cartridge have all been nominated as Most Innovative Peripheral

On the software side, Deluxe Paint III *from Electronic Arts,* Real 3D *from Activa,* Sculpt Animate 4D *from Byte by Byte,* Professional Draw 2 *from Gold Disk,* Disney Animation Studio *from Silent Software and* Art Department Professional *from ASDG have all been nominated as the Best Art Package.* KCS Omega *from Dr T,* Bars & Pipes *from Blue Ribbon,* Sonix *from Aegis and* Sequencer One *from Gajits get the nod for Best Music Package, while* Fun School 3 *from Database,* Disney Software *from Disney and* Henrietta's Book of Spelling *from Scetlander are battling for the Best Home Education Package. Finally there is the Best Home Productivity Package award, where the Amiga is again heavily featured, with* Superbase *from Precision,* Scala *from Digital Vision,* Professional Page 2 *from Gold Disk,* Deluxe Paint III *from Electronic Arts,* Protext 5 *from Arnor and* ProWrite 3 *from New Horizons. We will let you know who triumphs in the next issue.*



The A500 is nominated for Computer of the Year again

USER GROUP NEWS

by Janet Bickerstaff

Members of ICPUG South East (part of the Independent Commodore Products Users Group) were intrigued to see a Xetec CD-ROM drive in action with an Amiga 3000 at their latest meeting. Member Jolyon Ralph had imported the drive from the States. The matching metal-cased CD-ROM drive sat neatly between the Amiga 3000 and its monitor, connected through the SCSI port. Among the many CDs available is one containing a large part of the Fred Fish PD library – much more convenient than around 400 floppies.

A large crowd is expected when Dave Parkinson of Ariadne Interactive demonstrates the CDTV to ICPUG South East – Ariadne's Sophia authoring system is among those used in preparing CD-ROM discs for the machine. ICPUG South East has one lecture night a month and, in addition to Dave Parkinson, future speakers include barrister Alistair Kelman on legal matters and Simon Tranmer on latest developments from Precision Software. Other nights are open nights, on which members bring their own machines, and regular PD software nights are held on which the ICPUG PD library is available free of charge. The group meets at 7.45pm on Thursday evenings (except first Thursday of the month). The venue is Biggin Hill Library, Biggin Hill, Kent.

John Bickerstaff, ICPUG South East ☎ 081-651 5436

AVOID THOSE EMPTY-SHELF BLUES

Want to know how to make sure you get hold of a copy of *Amiga Shopper* every month? Well turn to page 94 to find a marvellous subscription offer and a handy form you can give to your newsagent.

LOSING LATTICE

Confused by the changing title of SAS/Lattice C? To clarify the situation, courtesy of HiSoft's David Link, the program is currently still known as SAS Lattice C, but is becoming known just as SAS C. The latest version is 5.10A and David says HiSoft are pleased to talk to anyone interested in upgrading.

HiSoft ☎ 0525 718181

AMIGA ANSWERS

We've assembled the best panel of Amiga experts in the land and every month they'll be getting together to help solve your problems. Trivial or techie, Amiga Shopper has got the answers

Q

Final recurse

I have heard people talking about recursion in hushed, near-mystical tones. What is it exactly? And is it really so difficult to understand?

A

The idea of recursion is perfectly simple to understand; it's writing recursive functions that causes people headaches. If an object (a program, function, sentence, strand of DNA) is recursive, the description of it includes some reference to itself. The classic example is: "This sentence is false." If we accept the sentence as true, then it tells us that it is false. But if we take it to be false, then its meaning is not true – that is, it is not true that the sentence is false, therefore it is true. And so on ...

Another example is given by the words heterological and autological. These are words that can be applied to adjectives such that an adjective is autological if it can be applied to itself – heterological otherwise. 'Polysyllabic' is autological, as is 'small'; 'monosyllabic' and 'big' are heterological. Of course, the burning question is: is heterological autological or heterological?

This process of an object continually referencing itself in search of a definition is called recursion. As you can see, recursive definitions tend to go on forever – not really suitable for computer programs. To avoid this, a program includes a 'base case' – a point where the recursion ceases. This is best shown with another example.

The mathematical function 'factorial' is defined for integers greater than or equal to 1. The factorial of 1 is 1 (this is the base case). For any other integer, the factorial is the product of all numbers between itself and 1. So the factorial of 4 = 4*3*2*1.

The pseudo-code for factorial might look something like this:

```
factorial (n)
IF n=1 THEN
RETURN (1)
ELSE
RETURN n*factorial(n-1)
ENDIF
```

If you imagine calling this function with n=4, you can see that it needs to multiply 4 by factorial(3). Before this can be done factorial(3) has to be calculated – similarly for factorial(2). Finally, factorial(1) is called. The program produces an immediate result – in this case (1) – and returns it. Control then passes to factorial(2) which is able to resolve 2*factorial(1), so returns its result. Eventually control passes back to the original 4*factorial(3), and a final result is obtained.

Note that the variable n in the example is local to the function. So that when we call the function with n=4 and it calls itself with n=3, these two n's are independent. Also, each 'level' of recursion only has access to its own version of variable n. ***CR***

WHATEVER YOUR PROBLEM WITH THE AMIGA, WE ARE HERE TO SOLVE IT.

That's the task we have set ourselves in giving you the best possible support for your Amiga. We are confident that our experts can cope with anything you can throw at them. If they don't already know the answer to your problem, they will find it out. Read on for some of the typical, and obscure, problems you may encounter when trying to get the most out of your Amiga.

CONSULT *AMIGA SHOPPER*'S EXPERT PANEL

We are prepared to deal with any problem you have with the Amiga, from general enquiries about AmigaDOS or workbench, through questions about specific pieces of software and hardware, to advice on what you need to buy to do a particular task. If it's to do with the Amiga, we will help out. What we cannot do is offer this service over the telephone – do not phone us with your enquiries, but write or fax us at the address and number below.

We also cannot enter into personal correspondence – all enquiries will be dealt with in the pages of the magazine. This does mean a delay in solving your problem, but because most of the panel does not work in the main offices and we have to have time to produce the magazine every month, it's unavoidable. We will come up with an answer for you, but you will have to be a little patient and wait for it to appear in print.

Send your questions to: Amiga Answers, *Amiga Shopper*, 30 Monmouth Street, Bath BA1 2BW. Fax: 0225 446019.

The *Amiga Answers* panel consists of all three consultant editors – Jeff Walker, Mark Smiddy and Phil South – and of course resident technical editor Cliff Ramshaw. We will also be calling on the services of all our other contributors, so you won't be able to catch us napping on any subject. Each panelist will be dealing with queries in their own specialist area and it would help us greatly if, when writing, you label your query envelope with the name of the expert who can solve your particular problem. Below is a list of their areas of expertise. It's a list that we will add to and update every month so you will know who to write to about any subjects not mentioned here.

Gary Whiteley – Video.
Stuart Russel – Comms, CAD.
Paul Overaa – programming, music.
Mick Draycott – hardware, programming, MIDI.
Jeff Walker – desktop publishing, programming.
Mark Smiddy – AmigaDOS, business, CDTV, hardware projects, drives.
Phil South – public domain, graphics, AMOS.
Bob Wade – American football.
Cliff Ramshaw – anything else.

Q

Pseuds' corner

What is pseudo-code?

A

Pseudo-code is a recursive program that not only refers to itself but sits around contemplating the meaning of its own existence.

Only joking. It's simply a way of writing programs without getting bogged-down in the syntax of a particular language. It uses English-like words and a standardised set of constructs, such as IF, THEN, ELSE and REPEAT, UNTIL. It isn't a real programming language – you can't get a compiler for it – but it is an easy matter to convert a piece of pseudo-code into the language you require. Because of this, it allows short programs to be written in a clear and portable manner. ***CR***

Q

Change indirection

Having programmed in Amiga Basic for some time, I feel I'm now pretty competent, but I want to move to a faster, more efficient language. I was thinking of C, and have heard that it offers multi-level indirection pointer facilities. I have managed to write many varied programs without using these, so what are they and what are the advantages of using them?

A

As you are probably aware, a variable in a program is a means of remembering a value. The value may be an integer, a real number, a character, etc. It is held in memory and is accessed by using the variable's name. This is all that languages such as Basic will allow.

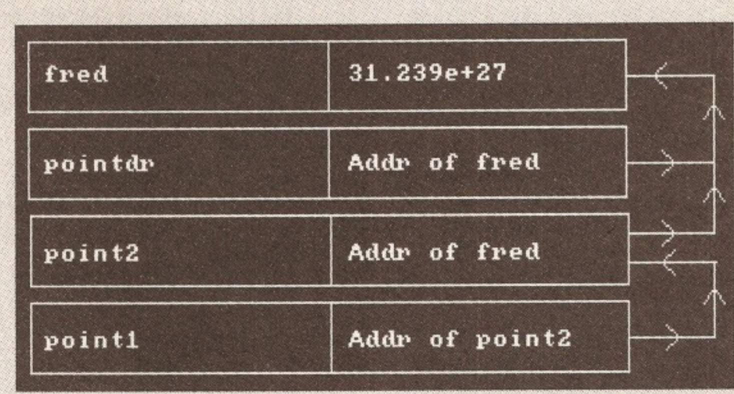
In C, a further type of value may be stored: that of a pointer. A pointer is a positive integer that represents (or points to) an area in the memory. Like other variables, each pointer has

its own name. Pointers are usually used to point to other variables, so that a variable's value may be accessed directly without needing to reference its name.

This is useful when a function is being called in C. Normally a function makes local copies of all the parameters it is supplied with. This means that when the function alters the values of these parameters, the originals are left untouched. To pass large data structures in this way would be time-consuming and wasteful of memory. It would be pretty pointless to do so anyway if the function was intended to modify the structure. Instead, a pointer, whose value is the location in memory of the structure, is passed to the function. Using this, the function can directly read and write the data structure's contents.

When calling AmigaDOS and Intuition routines, pointers are used extensively. Often a pointer's value points to another pointer which in turn points to a variable. Figure One should help clarify things. ***CR***

Figure One



The variable 'pointdr's value is an address that points to the variable 'fred'. The variable 'point1's value is an address pointing to 'point2', which in turn points to fred.

Q

Clocking on

I have bought a RAM expansion with a battery backed-up clock. Is there any way I can alter the startup-sequence in my Workbench disk so that the time is displayed at the top of my monitor screen while Workbench is running?

A

First, always make a copy of your Workbench disk before modifying it so that you can go back to the original if you mess the copy up. This is especially true when changing the startup-sequence since, if you make a mistake, you may not be able to re-boot your Amiga. Having safely made your back-up, it is time to start fiddling about.

The command you want is called, appropriately enough, Clock. You will be able to find Clock in the Utilities directory. There are a number of options useable with this command (you can find out what these are by typing 'clock ?' from the Shell) but a simple digital clock at the top of the screen can be displayed by keying in the line:

```
run clock digital2
```

The problem with this is that if you insert it into your startup-sequence, the initial CLI will not close down and you won't be able to see the Workbench screen – not a very useful state of affairs. This is because the Clock program has an input/output handler attached to the CLI, even though one is not required. To avoid this happening, the input and output of the command can be re-directed to NIL:, as below:

```
run <nil: >nil: clock
digital2
```

Simply insert this line in your startup-sequence between the path and the LoadWB commands, and, well, there you have it. ***CR***

Q

I see no C in PD

I was thinking of buying a C compiler from the public domain. The problem is that I don't know C very well, and I was wondering if such compilers come with their own manuals. If not, can you recommend a good book that will teach me?

A

More often than not, any documentation provided with a PD compiler will let you know about the peculiarities of its implementation, along with the commands necessary to compile and link programs. You would be very lucky indeed to find one that would teach you C.

There is a PD disk-based C manual for the Amiga, written by Anders Bjerin. It comes with lots of example programs and explains how you can use C to get at all the Amiga's graphics facilities, such as moving sprites and custom screens.

But if you want to learn C from scratch, probably the best place to look is *The C Programming Language* by Kernighan and Ritchie. This is the book that most C programmers swear by and, until recently, it provided the only definition of the language available. Of course, having taught yourself C, you will then have to learn how to program C on the Amiga, which is a task in itself. ***CR***

Q

Through the window

I have been trying to copy programs from my Workbench disk onto an empty disk of my own. Unfortunately, when I moved the icons into the new window they were placed on top of each other. Even if I expand the window and move them about, the next time I open the window up they are back where they started. How can I separate them?

A

There is a way to make Workbench remember any changes you make to a window, using the Snapshot option on the rightmost menu at the top of the screen.

You probably need a bigger window, so the first thing to do is expand it, and then, while the window is selected, select Snapshot. Whenever the window is opened it will appear at this new size.

Similarly, you can move an icon to where you want it inside the window and take a Snapshot of its new position. Bear in mind that the icon must be selected for Snapshot to work. If you want to move more than one icon, you can Snapshot each individually, or you can keep the shift key held down while you use the mouse to select all of them and then do a single Snapshot. ***CR***

Q

Install stalled

How do I install a disk with only one disk drive? I tried typing 'Install df0:' from the Shell, but a requester appeared asking me to insert the Workbench disk. When I did so, I got an error message saying that the disk is write-protected. Is there a way to make it realise that I want to install my own disk and not the Workbench one?

A

There are two ways around this annoying problem. The first is to put your Workbench disk in the drive and type:

```
install ?
```

The Amiga will respond with a list of the possible options and wait for you to type in those you require. At this point, take out the Workbench disk and put in the one you want to install. When the drive light has gone off, type:

```
df0:
```

And press RETURN. Your own disk will then be installed.

The alternative is to copy the install program from the C directory of the Workbench on to your RAM

I SEE NO TIPS

Don't need our help? Reckon you can do a better job of giving advice and tips on a subject? Well, do it! As well as asking for advice, we want you to give it too. If you have discovered a useful tip or two for any program, hardware, language etc, then send it to us and if it's any good we will use it on the Amiga Answers page and bung you £5 in return. If you think we have got an answer wrong, or have failed to give the full picture, then give us what you think is the right answer – we might even cough up some cash for that too. So don't just sit there, get tipping and help out your fellow Amiga owners. Send them to: Amiga Tips, *Amiga Shopper*, 30 Monmouth Street, Bath BA1 2BW.

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disk, using the command:

```
copy df0:c/install ram:
```

You can then insert your own disk and install it immediately with:

```
install df0:
```

It is a good idea, if you have enough memory, to copy those AmigaDOS commands that you use the most onto the RAM disk. It can save you an awful lot of disk swapping. ***CR***

Q

Banking on *Protext*

Recently I decided to use my Amiga to keep a record of my finances. I typed all my bank statements into *Protext* 4, but instead of saving the file as 'Bank_Account' as I intended, I mistakenly saved it as 'Bank Account', without the underscore. Now, when I try to make a backup of the file on another disk, I find I can't because AmigaDOS will not recognise filenames that have a space in them.

A

You can force AmigaDOS into treating a name including spaces as just one word by enclosing it in double quotes. However, the whole of the pathname must be in quotes. If, for example, your file was in the subdirectory 'Documents' on the RAM disk, you could copy it to df0: by the following:

```
copy "RAM:Documents/Bank
Account" to df0:
```

Alternatively, you could try using the Rename command, but again you must enclose the filename and its path in quotes. This would save any future confusion. ***CR***

Q

Big red one

Whenever my Amiga crashes I get a great big flashing red box and a Guru Number. What do they mean, and what possible use can they have?

A

To most people, the short answer is not a lot. The initiated, however, use the Guru Meditation Number to tell a great deal about what has caused the machine to crash. All of the Alerts (the proper name for a Guru box) are defined in the system header file called 'exec/alerts'. You can get a listing of that file from the Addison Wesley *Includes & Autodocs* manual. Now for an approximate translation of what it all means.

The alert number is divided into several parts. The bit to the right of the decimal point is the memory address of the task that was running when the error occurred. The left hand portion is an encoded error number in which the first two digits identify the operating system module that reported the error (this is called the Subsystem ID).

The next two digits specify the general error-type, which identifies such things as out-of-memory conditions and missing libraries. Finally the last four digits give more specific information about exactly what type of error has occurred (with the interpretation depending on the particular subsystem involved).

Alerts can also be caused by a 68000 processor exception and, when this happens, the subsystem and general error codes will be zero. The specific error code will be the 'trap number' of the trap as defined by the 68000 chip. The error code 03, for instance, means a 68000 addressing error has occurred.

While talking about guru alerts, it's worth mentioning that, in many cases when the initial 'Software Error – task held' requester appears, it usually means just that – the rogue task has just been prevented from running. Providing that the program concerned has not screwed the operating system up (eg by overwriting important system memory locations) there's a chance you'll be able to switch to another window (or open another CLI) and save any important files before selecting CANCEL and rebooting. ***PO***

Q

Making a DIN

How do I get MIDI information into sequencers such as *Music X* or Dr T's *KCS* program?

A

The Amiga collects MIDI data via its serial port, but to get the right electrical and cable connections you have to use something called a MIDI interface (these cost from £20 upwards and are available from almost all Amiga dealers). Take one MIDI lead from the MIDI-OUT terminal of the synthesizer (or whatever it is that you are using) and connect it to the MIDI-IN terminal on the interface. Assuming you also want to play back your recording, you then need to take a second lead from the MIDI-OUT terminal of the interface and connect it to the MIDI-IN terminal on the synthesizer.

Recording is simple. You just load your sequencer program, set it into record mode (you'll have to look in the sequencer manuals for this sort of information because every sequencer has a different way of doing this) and play. Whenever you touch the keyboard, or alter a control, your synthesizer will transmit digital messages (MIDI messages) and it is these messages that the sequencer will store.

Once you've recorded something just select the sequencer's play option (again all sequencers have different ways of doing this) and copies of the recorded messages will be sent back to the synthesizer. The result? The synthesizer will use those MIDI messages to recreate the music you originally played.

Once familiar with the basic ideas, you'll find very few problems in practise. When things do go wrong it will usually be something annoyingly simple, such as plugging one of your leads into the wrong socket or not having the instruments set to the right MIDI channels.

Many newcomers do in fact get quite confused about MIDI channels and the standardisation of the MIDI messages, so here's the brief run-down: MIDI recognises the existence of 16 separate channels and a large class of MIDI messages, known as Channel messages, contain a channel number embedded within the message. This allows pieces of equipment to be selective about the types of messages they make use of and that's why it is possible to have electronic drums, sequencers and synthesizers etc, all attached via a single cable loop.

It's a bit like someone writing a letter to yourself, sticking it in an addressed envelope and posting it. The letter, along with a great many others, gets shuffled around the mail system, but the contents are essentially ignored until it arrives at your door. You know the letter is for you because it's got your name and address on it – MIDI units know when a channel message has arrived for them because it has their channel number built into the message.

The formats of the various MIDI messages are laid down in the MIDI standard. At the highest level, you've got the channel messages just mentioned and messages of more general interest to the system. These latter 'System messages' fall into three sub-categories known as Real Time, Common, and Exclusive.

What is not laid down in the standard is the number of different types of message that pieces of equipment must transmit, nor in many cases the exact effect of MIDI's special controller messages. Some budget-priced synthesizers transmit just a few basic messages types. The more expensive models usually offer far more comprehensive facilities. For specific details of what facilities are or are not supported, you'll have to look at the MIDI Implementation Chart and which will be provided in the synthesizer's manual. ***PO***

Q

Listing links

I am in the process of writing a simple database program. Obviously, the actual amount of data will be variable, and I have heard that the best way to store this data is by using something called a 'linked list'. How do I implement 'linked lists' using C?

A

In C, linked lists are usually implemented by using pointers. Each list item will contain some data and a pointer to another similar item. This in turn will contain yet another data item and a pointer field which is used to identify the next item (if there is one). Conventions, such as using a special 'header node' and setting the last pointer in a chain to NULL, help identify the beginnings and endings of such chains.

Chains that are linked by one pointer per item can of course be searched in one direction only. To be able to traverse such lists in two directions (ie, backwards and forwards) we need two pointers per item and that is why these arrangements are normally called 'doubly-linked lists'.

There are all sorts of variations on this basic theme. If, for example, you wanted to retrieve items from the start of the list but always to add new items to the end of the list (ie create a queue arrangement), then you would need to keep a record of the location of the last item in the list (the tail) as well as the first real item. In that situation the best idea is to include both pointers within the header node.

Where do these items get stored? Well, it's possible to make a static memory allocation or dynamically pre-allocate enough memory for the items to be stored. The trouble with this approach is that that the list can overflow, even though there may still be system memory available.

One of the most versatile ways

around this is to use calloc()/free() calls to dynamically allocate memory for items as is needed. It's not difficult to do and perhaps the best idea is to give an example – here's the rundown on how to create a dynamic allocation version of the queue arrangement just mentioned:

You need to create a queue descriptor structure which contains pointers to the first and last items of a linked list of queue items (NULL if queue is empty). In the following examples I've also included a value representing the size of the objects being placed in the queue – this allows me to use the same routines with multiple lists, each storing different sized objects. A suitable queue header (which I call the queue descriptor) might look like this:

```
struct QueueDescriptor
{
struct QueueItem
*FirstItem;
struct QueueItem
*LastItem;
UBYTE ItemSize;
};
```

The queue items themselves would need to be based on a structure containing a 'next item in the queue list' pointer, and a reference to the first byte of some unspecified data item. The following instruction would do the job:

```
struct QueueItem
{
struct QueueItem
*NextItem;
UBYTE Data[1]; /*
actually user defined
amount of data */
};
```

With these type of structures the rest is easy. To check whether a list is empty, for instance, you just have to examine the head entry to see if it's a valid (ie non NULL) address.

In other words if the address:

```
queue_descriptor_p-
>FirstItem
```

is not NULL then you will know that the list isn't empty and that the first real item in the list will be found at that address.

The ideas are easy enough, but it'll make more sense if you have some code to think about. Figure Two shows a couple of routines that illustrate the sort of code needed to add and remove items from such a queue. I've used ANSI-style C where QUEUE is a generic (void *) type pointer (hence the cast at the start of the routines). If you get stuck, or if this hasn't answered all your questions, write again and we'll try and convince Bob Wade to run an in-depth tutorial. *PO*

Q

OU-Bridge

I am about to embark on an Open University computing course and the recommended machine is an IBM PC. I have heard that it is possible to get a 'bridgeboard' for my Amiga 2000 that will give me PC compatibility. What exactly does this involve?

A

The AT/XT bridgeboard hardware consists of a large board that fits into one of the large expansion slots inside the Amiga 1500/2000. It has the capability to emulate an IBM PC, with a high level of compatibility, from within the Amiga environment.

What this means, in essence, is that by clicking on a icon you can change the Amiga instantly into a PC, with the resultant increase in the availability of business software that is currently in circulation for that machine. The change is not permanent however, and closing the window will bring the computer straight back to its original Amiga state. Flicking between windows will always bring you back to where you were on the PC. A Ctrl-Alt-Del key sequence while in emulation mode will reboot the PC without affecting the Amiga in the slightest.

There is no need for additional hardware; the PC emulation supports CGA and Monochrome graphics modes on your normal Amiga monitor. A switch on the board itself will determine which of these modes it will boot in, and another will configure the available memory. A VGA card can be purchased, but this would necessitate the adding of another suitable monitor to display the higher level of graphics. Otherwise, the only recommended extra purchase would be a hard disk drive, although this is not essential.

A special Workbench disk is supplied with the hardware, sporting a PC drawer (including all the extra facilities available for the PC) and a Janus handling device located within the expansion drawer. When this Workbench disk is loaded, the BindDrivers command in the startup-sequence uses this device to configure the bridgeboard for subsequent use. All of the above can be copied to a normal Workbench 1.3 disk provided there is enough room after deleting unwanted files.

A hard disk drive, 5.25-inch floppy or 3.25-inch disk drives can be added directly to the bridgeboard but this would then mean they would not be accessible by the Amiga. A better configuration would be to have a hard disk connected to the Amiga and allow the bridgeboard to access a portion as a pseudo hard drive.

If all this sounds a bit complicated, it isn't. A large file is merely created on the Amiga hard disk. The Amiga sees this as a normal yet unusable file in its own directory, but by the PC it can be formatted and used just as though it were its own dedicated hard disk. Isn't it amazing what they can do with computers these days?

If you think that is impressive, then you might also be interested to know that it is possible to create virtual drives on just about any Amiga drive device, including the RAM disk and 3.5-inch floppy, thereby allowing them to be temporarily converted to PC peripherals for the time you are working with the bridgeboard. A virtual drive is similar to the Amiga's RAM disk. It is configured for an initial size and will grow as more data is added to it.

In order to achieve these effects, as small program called *PCDisk* must be running prior to accessing the bridgeboard. This can easily be overcome by placing the command in the startup-sequence.

Other commands in the PC drawer allow the bridgeboard to update its built-in clock with that of the Amiga, convert the Amiga mouse

continued on page 16

Figure Two – Clever queues with C

```
BOOL AddToQ(QUEUE
*descriptor_p, UBYTE
*data_item)
{
BOOL error_flag=TRUE; COUNT
i; struct QueueItem
*new_item_p;
struct QueueDescriptor
*queue_descriptor_p;
queue_descriptor_p=(struct
QueueDescriptor
*)descriptor_p;
if (new_item_p=(struct
QueueItem *)
calloc(1, sizeof(struct
QueueItem)-
1+queue_descriptor_p-
>ItemSize))
{
if(queue_descriptor_p-
>FirstItem)
{

queue_descriptor_p->LastItem-
>NextItem=new_item_p;

queue_descriptor_p-
>LastItem=new_item_p;
}
else
{

queue_descriptor_p-
>FirstItem=new_item_p;

queue_descriptor_p-
>LastItem=new_item_p;
}
for (i=0;i<queue_descriptor_p-
>ItemSize;i++)
{new_item_p-
>Data[i]=*data_item++;}
error_flag=FALSE;
}
return(error_flag);
}

/* ----------------------------------
-------------------------------- */

BOOL RemoveFromQ(QUEUE
*descriptor_p, UBYTE
*data_item)
{
BOOL error_flag=TRUE; COUNT
i; UBYTE *dead_block_p;
struct QueueDescriptor
*queue_descriptor_p;
queue_descriptor_p=(struct
QueueDescriptor
*)descriptor_p;
if (queue_descriptor_p-
>FirstItem)
{
for (i=0; i<queue_descriptor_p-
>ItemSize; i++)
{

*data_item++=queue_descripto
r_p->FirstItem->Data[i];
}
dead_block_p=(UBYTE
*)queue_descriptor_p-
>FirstItem;
queue_descriptor_p-
>FirstItem=queue_descriptor_p
->FirstItem->NextItem;
if(queue_descriptor_p-
>FirstItem==NULL)
queue_descriptor_p-
>LastItem=NULL;
free(dead_block_p);
error_flag=FALSE;
}
return(error_flag);
}

/* ----------------------------------
-------------------------------- */
```

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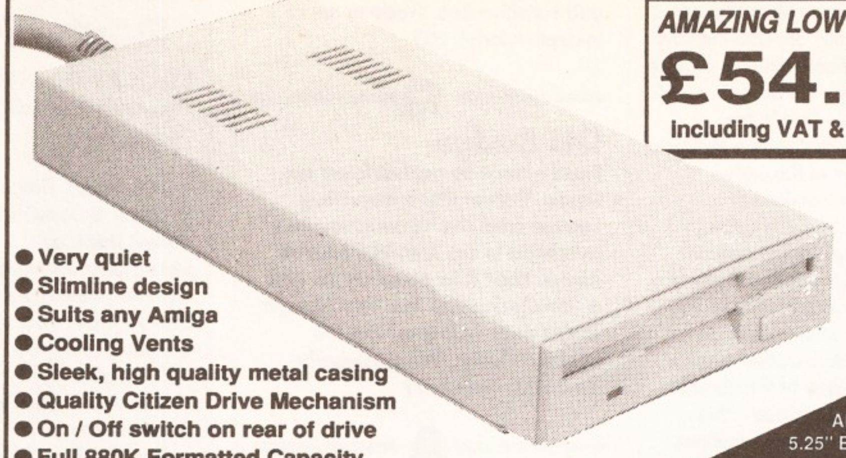
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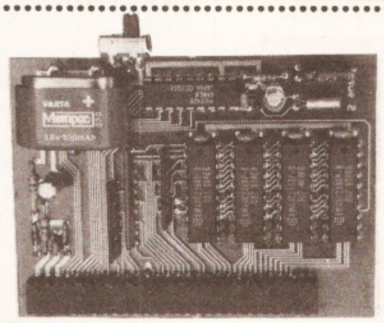


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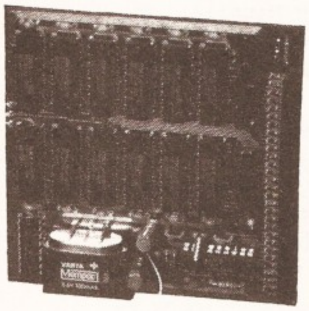
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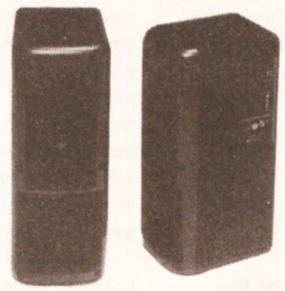
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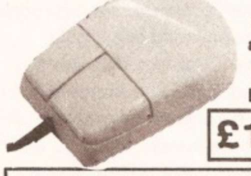
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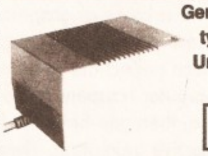
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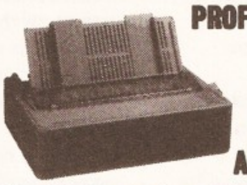


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continued from page 13

to the PC, and switch the parallel port to accept output from the bridgeboard. A PC preferences program is also available to fine tune everything just the way you like it.

Copy and paste facilities are available, enabling the Amiga to extract text from the bridgeboard, and vice versa, via a communal clipboard. Bridgeboard colours can be decreased for extra processing speed or increased up to a maximum of 16. Windows can be added and existing ones frozen, the cursor speed can be adjusted and the user may decide how much processor time should be devoted to the PC. The Amiga certainly does enhance the basic facilities of a PC, although it has to be borne in mind that once the PC is emulating, it is just that – a PC, with all its inherent wobbly mouse pointer and our old friend, MeSsy DOS.

All the favourites, such as *dBase*, *Wordstar*, *Reflex* and *Lotus* 123 appear to run without problems, but there are a few programs that don't. The *Fixed Disk Organiser* (on a pseudo disk) seems to be one of them, and there are bound to be a few others.

Many of the questions I am repeatedly asked about the bridgeboard refer to the installation and setting-up of the pseudo and virtual drives. If enough of you write in (hint, hint!) then maybe I could be persuaded to write an article addressing these problems.

The bridgeboard is not exactly cheap, especially the AT version. Many PC clones are advertised for less, but when a PC can be physically enhanced by the multi-tasking abilities of the Amiga, it has to be very seriously considered. Besides, incorporating two great computers into one takes up a lot less room on the desk. ***MD***

Q

A tad of RAD:

What is RAD:?

A

The term 'RAD:' can strike terror into the heart of the average Amiga user. It doesn't stand for RADiation or RADical or anything dangerous. It means Recoverable RAMdrive.

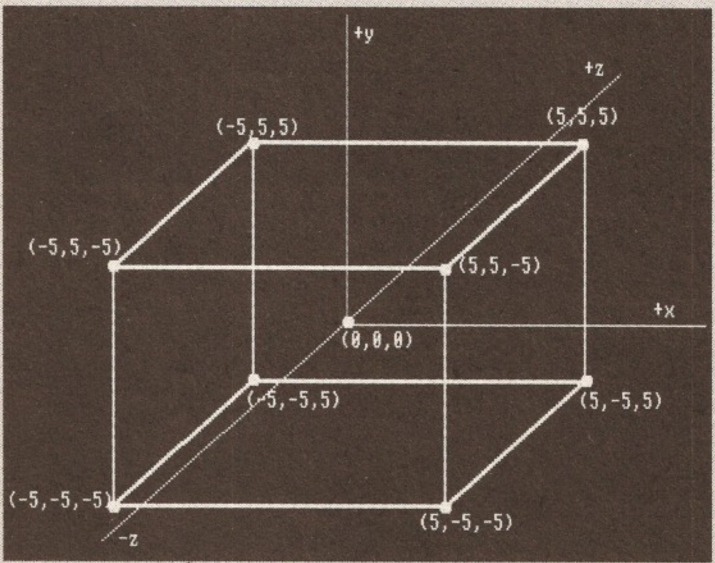
A Recoverable RAMdrive emulates an external disk drive from within the computer's memory, retaining data after the Amiga has been re-set. The necessary entry for RAD: can be found within the DEVS:MountList file of the Workbench 1.3 disk that comes with your Amiga.

The normal RAMdrive, which is automatically mounted when Workbench is loaded, is suitable for most needs because it dynamically uses as much memory as it requires, adjusting its size as files are added, deleted or until available memory is exhausted. This is why it always appears full.

RAD is not dynamic. Once memory has been allocated to it, it is lost for ordinary use until RAD is removed with the Shell command RemRad and the machine is re-booted. Users with 1Mb and more will find this a small price to pay for an extra disk drive that can load and save data at up to four times the speed of a normal drive. The RAD drive is not limited to the size prescribed in the MountList; it can be increased to 880k (normal disk drive size) or more.

The real benefit of RAD: is that, with a reasonable knowledge of the Shell, a small startup-sequence can be placed there which can make the necessary assignments and mounts before passing control to a non-bootable hard disk, thus converting it to a bootable hard disk, to all intents and purposes. ***MD***

FIGURE THREE: DEFINING A CUBE



Q

Blitter witter

I have heard that one of the things that makes the Amiga special is its 'blitter'. What is it and what is it used for?

A

The blitter – short for Block Image Transfer – is a sequence of instructions within Agnus to move data from one location to another. Because this is a custom chip with little dependence on the main processor, this can all happen extremely quickly.

So, you might ask, why should I wish to move data from one location to another at blinding speed? Well, the answer lies in the Amiga's graphics capabilities.

If a block of graphics data can be moved quickly enough and it doesn't effect the other actions the computer happens to be doing at the time, then you have the basis for effective animation. There are many ways that this can be used.

Page flipping, where one screen is replaced by another, will give the impression of movement if the images of each screen are subtly different. This involves the blitter in the same way that a Clear Screen command does, by filling the relevant area of memory with given data.

The blitter can also be used to scroll rectangular areas of the screen either horizontally or vertically. There is a Graphics library routine called ScrollRaster which is used for this purpose. A blitter object – or BOB as it is more commonly known – is implemented by using the blitter to capture a specific area of data (the image) and transferring it to another area, either on or off the screen.

The image need not be transferred exactly as captured. 'Masks' can be introduced to affect the way in which the final image will be portrayed. A mask, put simply, is a means of extracting selected parts of an image and leaving the rest, typically the background, behind. The mask consists of logical operations such as PSET (switch a pixel 'on'), PRESET (switch a pixel 'off'), AND, OR and XOR.

You have probably used the blitter chip in your progams without realising it. The GET and PUT array commands and the SCROLL command in AmigaBasic automatically access the blitter. For C programmers, the necessary blitter routines are in the Graphics library, but there are certain rules that you will have to adhere to otherwise an unwelcome visit from Mr Guru is more than likely.

Check out the libraries or computer stores for some good books to help you explore this area more fully. Amiga games programmers make extensive use of the blitter, and you will too if you know a good thing when you see it. ***MD***

Q

PC pix problem

Is there a program available to display and save PC picture files as IFF?

A

There are several ways to do this. One way is to convert the PC files to GIF format on a PC and then use the PD program *HAMGIF* to convert them to IFF. This is handy for those hard-to-view 256-colour VGA pics. Another way around it is to get the PC file into PICT format and use *Imagelink*. Unfortunately, most image crunchers are in PC format, you see, but they do work with PC Emulators like the KCS Power PC board. The programs I would recommend are *Optiks*, *Hijaak* and *Graphics Workshop*. *Optiks* and *GWS* are shareware, but *Hijaak* is a commercial program. All three of these handle Mac, PC and Amiga format picture files. If any coders are reading this, the market is ripe for a reliable Mac/PC/Amiga picture file switcher on the Amiga, so get coding and send us a copy while you're at it. ***PS***

Q

Æ, what's up?

How do I include ['ae' joined together] and ['a' with a little circle above it] in text entered in *Deluxe Paint*?

A

The command you are after is setmap, which you can find in the System drawer. The tricky thing about

using setmap from Workbench is that it needs you to alter the default tool in the Info menu. A more reliable way to alter your keymaps is to insert it into your startup.sequence, as this loads up when you boot and stays put. The line might look something like this:

```
System/setmap n
```

There you go. ***PS***

Q

Open says me

There is a Close Workbench command on AMOS; is there an equivalent Open Workbench command?

A

Close Workbench should only really be put into a program if you are short of space. It closes the Workbench down, saving you an all-important 40K of space. Unfortunately, there is no Open Workbench command and frankly there is no need for one. When a program finishes, it re-opens the Workbench for you. The only way to get Workbench back is to close AMOS and open it again. ***PS***

Q

Over the bar

Disney's *Animation Studio* uses .SMUS score files to play music. Are there any programs on the market that will enable me to create an SMUS conversion?

A

SMUS is the IFF format for music scores on the Amiga. At least, it was until everyone caught on to how large and inefficient it was.

Nowadays everyone uses *Soundtracker* and its equivalents. There are a couple of utilities and programs that convert from SMUS – *Music X* for example – but very few that convert to SMUS, it being such an outmoded standard and all that. You could try using *MED* 3.0 (available from Amiganuts) to load a soundtracker score, play it out as MIDI into another Amiga running *Sonix* or *Deluxe Music Construction Set*, then edit the instruments, although I admit that is a slightly convoluted signal path. The problem is that SMUS does not save its instruments, but stores them in a separate directory called Instruments, whereas *Soundtracker* modules store the samples as part of the file. ***PS***

Q

Fly by wire

I have been planning a game for some time now. It is a 3D game using wireframe graphics, but I'm having some trouble in representing a 3D shape on a 2D screen. How is this done? Also, how do I make these shapes rotate? The effect I'm looking for is similar to the way the spaceships in *Elite* turn in space.

A

What you need to do is to keep track of two separate co-ordinate systems: the imaginary three-dimensional one in which your game takes place and the two dimensional one of the screen you are using. The trick is to know how to make the transformation between the two.

First you have to define your 3D shape. Wireframe shapes are stored as a series of points representing their corners. Since these need three values to specify them, the easiest method is to use three arrays (X, Y and Z). Then your drawing routine goes along these arrays, drawing lines between each point and the previous one. Using this method, you have to define some corners more than once. A cube, for example, needs 16 points instead of the expected 12. This is so that all of the joining lines are drawn. See Figure three for an example. Notice that all of the coordinates are defined relative to the cube's centre.

Now we come to plotting the shape. Since the cube exists in 3D space, a further set of coordinates is required to define its position in this space, say Xpos, Ypos and Zpos. These define where the centre of the cube will lie. The absolute coordinates of any point in our cube can be found by adding the point's relative coordinates to [Xpos, Ypos, Zpos]. Before we plot this point (or rather, draw a line between it and another point) we must transform the resultant coordinates [Xabs,Yabs,Zabs] into a set of 2D screen co-ordinates [Xscr,Yscr].

Assuming our vanishing point (ie the origin of the 3D coordinate system) lies at the centre of vision, [Xscr,Yscr] may be derived in the following manner:

```
Xscr = Xabs/Zabs and Yscr
= Yabs/Zabs.
```

This division by the Zabs coordinate gives us the effect of perspective, since the higher Zabs is, the further away from the viewer the object is and the smaller it should appear. In practise, a scaling factor usually needs to be included to prevent too much distortion. So:

```
Xscr = Xabs/(Zabs*Zscale)
and Yscr =
Yabs/(Zabs*Zscale)
```

One thing to be careful of is that Zabs is always greater than zero, otherwise a divide by zero error may possibly occur.

Although the origin of our 3D system is at the centre of the 'screen', the origin of the 2D screen coordinates is in the top left corner. For this reason, Xscr and Yscr need to be shifted by half the horizontal and half the vertical resolution respectively. So the final transformation, in low resolution mode, is:

```
Xscr = 160 +
Xabs/(Zabs*Zscale)
Yscr = 100 +
Yabs/(Zabs*Zscale)
```

The cube can be moved around the 3D system by changing its coordinates [Xabs,Yabs,Zabs], but rotations involve a certain amount of trigonometry.

The forumla for a rotation through an angle theta about the z axis is:

```
x = x*cos(theta)-
y*sin(theta)
y =
x*sin(theta)+y*cos(theta)
z = z
```

Figure four, below, shows a simple Basic program that creates a 3D cube and then moves and rotates it about the screen. Unfortunately, it's rather slow, but it should give you an idea of what is going on. To do this sort of thing properly you could really do with getting to grips with C or assembly language. ***CR***

Q

Star driver

I have bought a Star LC24-200 printer and can't get much

FIGURE FOUR: ROTATING CUBE

```
SCREEN 1,640,200,4,2
REM ** 3d Box
WINDOW 2,,,28,1
DIM X(16),Y(16),Z(16)
Xorigin=320: Yorigin=100
Zscale=.002
pi=22/7
xpos=0: ypos=0: zpos=50: REM
** position in 3d space of
box
REM ** read in coordinates of
cube
FOR i=1 TO 16
READ X(i),Y(i),Z(i)
NEXT i

DATA -5,-5,-5,-5,-5,5,5,-
5,5,5,-5,-5,-5,-5,-5
DATA -5,5,-5,-5,5,5,-5,-5,5,-
5,5,5,5,5,5
DATA 5,-5,5,5,5,5,5,5,-5,5,-
5,-5,5,5,-5,-5,5,-5
GOSUB boxdraw
deg=11.25
rad=deg*2*pi/360
REM ** main loop for
animation
FOR j=1 TO 100
GOSUB rotate
zpos=zpos+4
xpos=xpos+INT(RND*5-2)
ypos=ypos+INT(RND*3-1)
CLS
GOSUB boxdraw
NEXT j
GOTO finish
rotate:
REM * rotating about box's
centre
FOR i=1 TO 16
CALL turn(X(i),Y(i)): REM *
rotate about z
CALL turn(Y(i),Z(i)): REM *
rotate about x
NEXT i
RETURN

SUB turn(a,b) STATIC
SHARED rad
c=a*COS(rad)-b*SIN(rad)
b=a*SIN(rad)+b*COS(rad)
a=c
END SUB

boxdraw:
Xabs=X(1)+xpos:
Yabs=Y(1)+ypos:
Zabs=Z(1)+zpos
GOSUB perspective
Xold=Xscr: Yold=Yscr
FOR i=2 TO 16
Xabs=X(i)+xpos:
Yabs=Y(i)+ypos:
Zabs=Z(i)+zpos
GOSUB perspective
LINE (Xold,Yold)-(Xscr,Yscr)
Xold=Xscr:Yold=Yscr
NEXT i
RETURN
perspective:
Xscr=Xabs/(Zabs*Zscale)
Yscr=Yabs/(Zabs*Zscale)
Xscr=Xscr+Xorigin
Yscr=Yscr+Yorigin
RETURN

finish:
END
```

continued on page 18

continued from page 17

sense out of it. My friend says I need a printer driver. What's a printer driver?

A

A printer driver is part of the background team which acts as translator between the Amiga and the printer.

The application that wants to send data to the printer hasn't the faintest idea which printer you have, so it sends standard ANSI escape codes to the Amiga's printer device (PRT:) instead. There is a full list of these escape codes in Appendix D of the Amiga 500 manual.

The printer driver itself is a program like any other and it multi-tasks quietly in the background waiting for something to speak to it, at which point it jumps into action translating the standard ANSI escape codes into commands that the printer can understand.

There are two 'standard' sets of commands for printers – one lot invented by IBM, the other by Epson. Such printers are advertised as IBM Compatible or Epson Compatible; a fair few printers are both IBM and Epson compatible.

But not all printers adhere to one or other of these standards. Some stick to a standard for the most part, but add extra commands for features unique to that particular printer. Other printers are unique and have a whole new set invented for them. Some of these printers have become so popular that their commands sets are now standards in their own right; Hewlett-Packard printers for example.

So you can see that it would be impossible for one printer driver to be able to talk to every printer there is as such a program would be massive. Which is why you a need a single specific driver for your printer.

The Star LC24-200 supports all the IBM and Epson printer commands – in fact the whole LC24 range does. On the whole, especially for bit-image graphics output – screen dumps from *DPaint*, text output from *KindWords* and the like – you should stick to its Epson emulation.

When all that is being sent are ASCII characters, output from a text word processor, database or spreadsheet for example, the printer driver can sit back and let everything pass through it untouched. Its real job is to interpret the escapes codes that switch special style effects on and off, like underline and italics, and to set things like tabs and margins. And let's not forget graphics.

Graphics works a bit differently. With graphics the printer first needs to be told that the data being sent to it is bit-image (screen dump) information, not ASCII characters, then it needs to be told how much data is coming. The amount of data sent depends entirely upon the Density setting in the Change Printer/Graphics 2 part of Preferences. Normally you would want to print graphics at the highest density your printer can manage, so it should be set to 7.

Now, the rest of the world will tell you to use the EpsonQ driver with the Star LC24-200, but I'm going to let you in on a little secret. The whole Star LC24 range has a maximum density of 360 x 360 dots per inch (dpi), but the maximum density of the EpsonQ driver is only 360 x 180 dpi. That's fairly common knowledge. Here's the secret: The NEC_Pinwriter driver is totally Epson compatible and has a maximum density of 360 x 360 dpi. So all you owners of Star LC24 printers, go into Preferences, change your printer driver to NEC_Pinwriter – you'll find it in the devs/printers drawer on the Extras 1.3 disk – and set the Density in Graphics 2 to 7. I have tried it and it works just fine.

If you don't know how to select a printer driver, check out Chapter 6 of the Amiga 500 manual.

Incidentally, if you're getting squashed or distorted screen dumps out of your Star LC24, it means the machine is in IBM mode. Read your manual to find out how to switch it into Epson mode, which is the manufacturer's default setting. For the LC24-10 you need to have dip switch 6 set to ON and for the LC24-200 you have to mess around with the keyboard overlays and the buttons on the front panel; the LC24-200 will tell you which mode it is currently in if you put some paper in the printer and switch it on while holding down the on-line key. ***JW***

Q

Kicking the bench

Lately I've been reading a lot about Workbench 2.0 and how wonderful it is. My question is a simple one – will it work on an Amiga 500?

A

Workbench 2.0 is only going to work if it has Kickstart 2.0 and AmigaDOS 2.0 to play with as well – the whole lot is referred to in developer circles as System 2.0.

In the Amiga 3000, a lot of the new system is on ROM and the only way to get the new Kickstart into an Amiga 500 is to load it into WORM RAM (Write Once Read Many) from disk in a similar way that Amiga 1000 owners have to with the old Kickstart. But it takes up a dirty great chunk of memory and the loader only works with machines that have a 1Mb or greater expansion that autoconfigs at $20000.

Currently, distribution of System 2.0 is restricted to registered developers only; it is not public domain. Will you be able to buy it? Who knows? Speak to one department at Commodore and they say yes, speak to another department and they say no.

What is certain is that System 2.0's 16-colour Workbench, the feature that Amiga 500 owners seem to be getting most excited about, is going to eat up a lot of the Amiga 500's 512k of chip ram, so an upgrade to the Fatter Agnus and the changes to the motherboard to get the 512k expansion in the trap door to configure itself as chip RAM have to be the first steps to take. Then you'll need some more autoconfig memory for Kickstart to load into.

Alas, if it is released for the Amiga 500, System 2.0 is not going to be the quick and cheap upgrade that 1.3 was. ***JW*** AS

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The harder they come...



Demon drivers Mark Smiddy and Cliff Ramshaw unpark more than 470 Megabytes of disk space and leave no parameter untested to bring you the full price-versus-performance lowdown on Amiga hard drives driven really hard



Those of us computing in the days of Spectrums and VIC20s will remember the agony of waiting for a program to load from tape, often only to find that there had been an error and the whole process had to be started again. Then came floppy disks. While giving a dramatic increase in speed (and avoiding the need to fast-forward and rewind through a tape to find the program you were after), even these began to seem painfully slow. The obvious answer was a hard disk.

Not only is a hard disk much faster, it can store more data. The smallest are 20Mb unformatted. Compare that to the Amiga's 1Mb floppy. For those with Kickstart 1.3, the machine can be booted from the hard disk, obviating the need to have a Workbench disk constantly to hand.

One seeming disadvantage of a hard disk over a floppy is the fact that the disk in the former is unremovable. In practise, this is rarely a problem because of the hard disk's far greater capacity. If it does become full, there are two options: either to copy the less used files on to floppy and remove them from the hard disk, or buy a bigger hard disk. It is possible to buy removable hard disks, but these are both expensive and rare.

Anyway, having convinced you of the time and money-saving benefits of owning a hard drive, which one should you buy? We have put eight drives through their paces – four for the Amiga 500 and four for the 2000 – and come up with an awful lot of interesting, and not a few surprising, facts. Read on to find *your* ultimate drive.

Whatever Happened To...

Several drives we had planned to feature did not turn up in time to meet our deadline. They will be featured in our regular update slot when they finally arrive – maybe they're just shy of incorruptible, attractive, enigmatic, hard-working critics.

Reasonable excuses were received from Power Computing, which found a slight glitch in its 40Mb Slimline model. It should be fixed by the time you read this, however. The same did not apply to Power's incredibly cute 20Mb Conner internal mechanism. It did show, but we were not prepared to butcher an Amiga just on the off-chance it might prove to be something extraordinary. That is not some thinly disguised jibe at the quality of the drive, but the spare machine, generally used for shove-in/crowbar-out tests, was being abused with a plethora of accelerator cards.

The Xetec Fastrak proved too tricky to get running in time and the Vortex units refused to show at all, despite numerous phone calls to their UK distributor. Finally, and sadly, the AdSCSI ICD 2000 was dead on arrival.

GVP Impact Series II A2000-HC+8

Drive: 173Mb
RAM: up to 8Mb

The Series II controller card can be bought in two formats: with and without the space onboard for 8MB of RAM. GVP drives range from 40 to 200 Mb. The one on test is a 173Mb Fujitsu M2614S, fitted to the end of the printed circuit board so the card takes up the whole length of the Amiga. The drive itself is deep enough to obscure another expansion slot unless the unit is fitted into the first.

Components are through-mounted on the card and layout is compact but tidy, showing no signs of last-minute changes. There is a SCSI socket at the end of the card – coming out at the back of the Amiga – for the addition of extra drives. Power for the card comes from the Amiga via the expansion slot. Installation is straightforward and clearly explained in the documentation.

Software is run from Workbench and comes up with an uncluttered screen from which the user can select either automatic mode, for those unfamiliar with hard drives – straightforward to use, yet still allowing choice on the number and size of partitions – or manual mode. The latter facilitates low-level formatting, reading and writing the rigid disk block and partition block, setting up the sizes of partitions and the files systems they will use, and so on. Once the drive has been formatted, the software will copy any floppy disks (such as Workbench and Extras) you care to have included.

Checkout

Speed 22/30
Fast, but not that fast. Performs well with HAM contention.

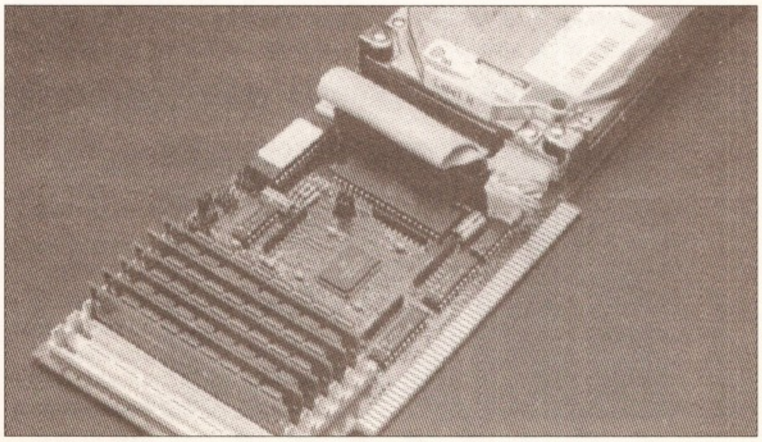
Construction..........17/20
Amazingly compact, with space for RAM on the same board.

Software...............22/25
Lots of power, but with a beginners option too.

Documentation......10/15
Good, but the software documentation could have been fuller.

Ease of Installation..7/10
As with most 2000 drives, a little bit of hassle, but easy enough.

Overall 78/100
A good, reliable, quick drive for a reasonable price.

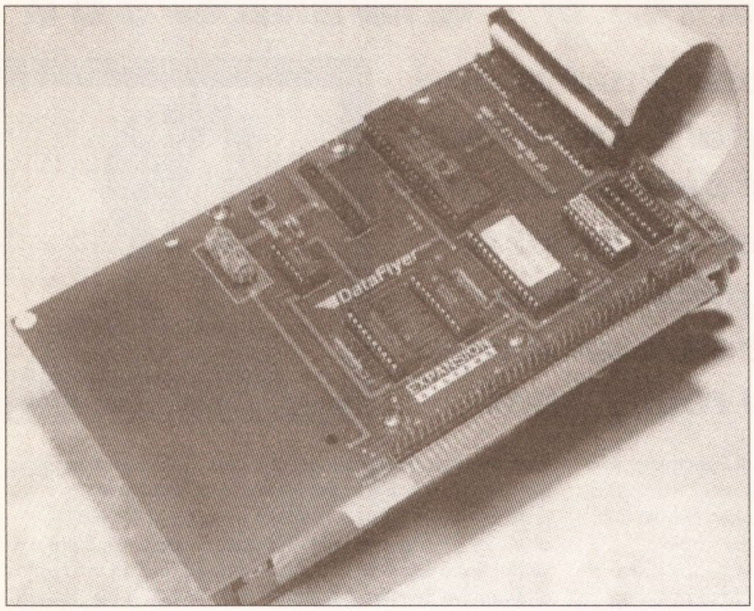


GVP would seem to be on to a winner here with this bijoux and versatile beastie, but perhaps should give more thought to the drive's manual.

continued on page 22

continued from page 21

The DataFlyer A2000



The Dataflyer is not the fastest or friendliest thing you could shove in a slot. A slim manual and skimpy on-screen help do this slowcoach down.

Drive: 48Mb
RAM: requires extra card.

The DataFlyer A2000, by US company Expansion Systems, is a newcomer to the Amiga hard disk scene. The controller card can be bought bare, or fitted with a number of SCSI compatible drives. Ours came with a 48Mb Seagate ST157N attached to the back of the card. Although the card is half the length of the others reviewed, because of the way the drive is fitted, it is necessary to put in the last expansion slot to avoid obscuring an adjacent slot.

The circuit board is remarkably bare. There is even an empty IC socket, which the manual says is 'by design', but offers no reason as to why such a design feature might be necessary. The components are through-mounted on the board. There is also a socket for an optional memory card that can hold between 4 and 8Mb of RAM. As with the GVP, the unit gets its power from the Amiga's expansion slot.

The slim manual explains, with the aid of diagrams, how to add a SCSI drive to the board and how to install the board in the A2000. It then moves swiftly on to outline the formatting of the drive using the supplied software. After this comes a section giving general advice for using hard drives, followed by troubleshooting advice with an outline of some possible problems. Although all the necessary information is there to get the system up and running, the manual is less than exhaustive.

Installation software is invoked from the Workbench screen by clicking on its icon. A Shell window is opened and the program asks the user a number of questions about the type of set-up required. This approach is not very friendly, but at least default values are supplied for the inexperienced. If partitions of different sizes are required, these sizes must be entered in terms of percentages rather than Megabytes.

Once all the questions have been answered, the user is confronted with a 'Do you wish to continue?' message. Typing [y] results in the drive being formatted and partitioned according to the entered parameters. The program then goes on to copy Workbench from a floppy disk on to the boot partition.

After you have done all that, it is time to reboot, and the system is then ready for the off.

CHECKOUT

Speed....................10/30
It could not be described as fast, but it still beats a floppy.

Construction..........13/20
Fairly basic, and sadly it obscures another valuable expansion slot.

Software...............10/25
Again, fairly basic, and could be intimidating to the uninitiated.

Documentation........7/15
A little on the terse side.

Ease of Installation..8/10
Slightly easier than the others because the card is shorter and less screws have to be screwed.

Overall................48/100
A slightly sub-standard drive in terms of performance, and not that much cheaper than the competition

JARGON BUSTING

FFS: Fast Filing System. A new filing system driver that was introduced with Workbench 1.3. Disk blocks are arranged so large amounts of data can be read quickly. Reads and writes are speeded up by up to seven times. Directory searching is around 10 times faster and the hard disk partition limit is raised to two Gigabytes. Some older hard disk systems cannot boot with FFS. Also, it is not available with floppy disks under AmigaDOS 1.3,making them slooooow. For comparison with OFS, we formatted RAD and a floppy disk under FFS 500 and ran the tests again. See Figure 7 for results.

HAM: Hold-and-Modify: As if you didn't already know, this is the Amiga's special screen mode which allows it to display 4096 colours at once – gosh! HAM also has a nasty habit of slowing the machine down – not noticeably perhaps, but it does. The result is simulated here with the drive timings taken when showing a HAM picture.

HIGH-LEVEL FORMAT: An AmigaDOS format. Prepares the drive for use with AmigaDOS by formatting it with OFS or FFS. New filing systems may become available in the future.

LOW-LEVEL FORMAT: Hard drives are weird beasties and this initial formatting is done by the drive controller, usually only once when the drive is first configured. Primarily this format controls queer things like interleave factors.

OFS: The old filing system dating back to the days of the very first Amigas. It works, but is not suitable for the improved speeds and storage capacities available with hard disks.

PARTITION: Part of the drive separated off from the rest. As far as Workbench, AmigaDOS and the rest of the world is concerned, a partition is a disk in its own right. Problems do come to the fore when you try to copy data between two partitions on the same drive.

PREP: Tells the drive what size it is, the interleave factor, filing system type, where the bad blocks lie, and so on. This sort of information is only useful to advanced users squeezing more speed from a drive.

SPEED TEST 2000 ● SPEED TEST 2000 ● SPEED TEST 2000 ● SPEED TEST 2000 ● SPEED TEST 2

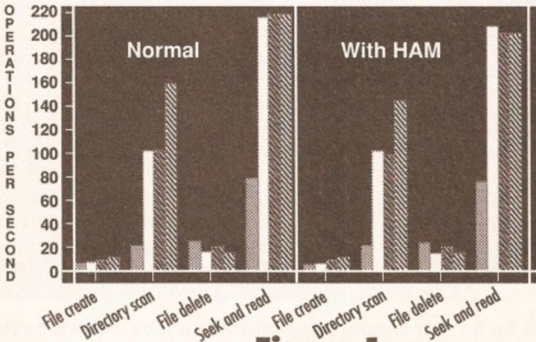


Figure 1

A2000 speed tests show speed of file handling and directory access, with Dataflyer on a flyer in seek and read.

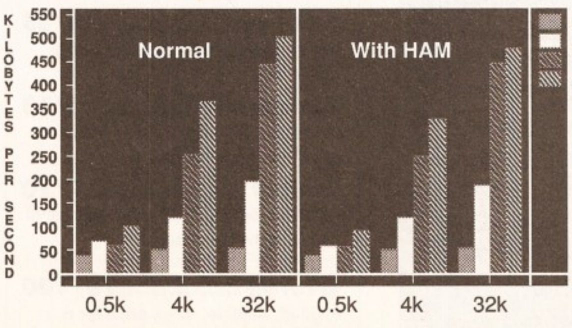
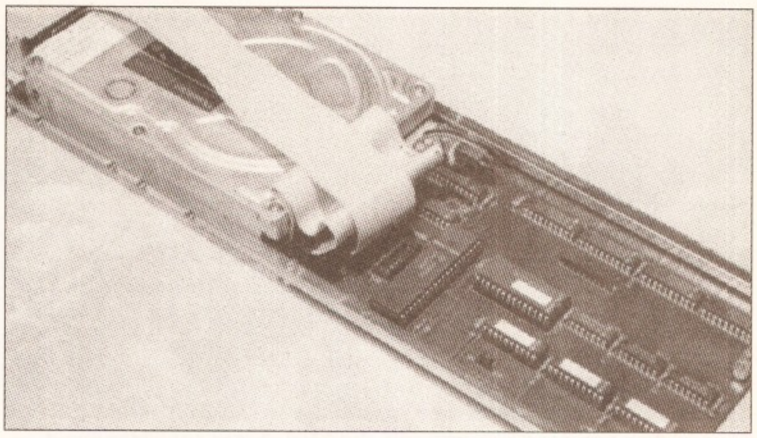


Figure 2

The raw read speed tests show the SupraDrive to be streets ahead of the pack, with the GVP snapping at its heels.

The SupraDrive WordSync 2000



The SupraDrive more than lives up to its monicker. Rip-roaring read and write speed plus ease of handling serve to make it a real drool drive.

Drive: 52Mb
RAM: N/A

This is another card that takes up the whole length of the Amiga, with the drive (a 52Mb Quantum LP52S) fitted on the rear end of the card by a couple of sturdy-looking steel rails. At the end is a SCSI socket, which protrudes from the back of the Amiga to take extra drives. The card is slim enough to fit in any of the available expansion slots without intruding on any of the others.

Like most of the other cards tested, the Supra takes its power from the Amiga's expansion slot. The components are all through-mounted on the circuit board, again like the others tested, but the layout is somewhat more complex, apparently requiring more chips to do the job.

Of all the drives reviewed, the Supra had perhaps the clearest documentation. The actual installation of the card is clearly explained, with plenty of diagrams of both the Amiga and the card itself. Once the Amiga's cover has been removed, a firm push sees the card securely fitted in the expansion slot. After that, it is a simple matter of connecting the LED plug, tightening a screw and finally replacing the cover.

That done, it is time to format the drive. The documentation is again supportive here, and the supplied software is marvellous. Clicking on an icon from Workbench results in a large, colourful screen being displayed. This is similar in many ways to the software supplied with the GVP. All the drive settings are clearly visible and easily changed. The software is quite intelligent, among other things being able to suggest the start and end cylinders of a partition given its size. Once everything has been set according to your needs, it is a simple matter of clicking on an icon and sitting back.

After rebooting the machine with Supra's Install disk still in the floppy drive, a script file is executed which kindly copies Workbench and Extras onto the hard disk's boot partition. After that you are ready to rock.

CHECKOUT

Speed....................27/30
The fastest of the drives tested

Construction..........18/20
Well built and slim enough to sit in just one drive.

Software...............22/25
Powerful and easy to use.

Documentation......11/15
Good, but there could have been more background information.

Ease of Installation..7/10
Easy once you have got the hang of it.

Overall................84/100
This really is the one to go for.

The Amiga 2094

Drive: 40Mb
RAM: N/A

A hard drive round-up would not be complete without a review of Commodore's own offering. The one reviewed comes with the 2090A controller card, successor to the earlier 2090 controller card, and a 40Mb Toshiba MK134 FA. As well as supporting SCSI, the 2090A can support up to two ST506 (PC-style) drives, but a cheaper card and controller is available that is only SCSI-compatible.

Unlike the others, this drive is not attached to the board but has to be fixed to the left of the floppy drive already installed. This done, one of the four-pin connectors from the Amiga's power suppy must be attached to the drive.

The controller card has to be fitted into one of the expansion slots. It is a long, slim affair, littered with through-mounted components and seems the most convoluted design of all those tested. At least it doesn't obscure the remaining expansion slots. There is a small socket on the card where the LED lead plugs in.

Before replacing the Amiga's cover, a ribbon cable has to fitted between the drive and the controller board. A second drive can be fitted internally using a 'daisy-chaining' ribbon cable (one with three plugs instead of two). Further drives can be attached to the SCSI socket, which comes out at the back of the Amiga.

Although the fitting of the hardware is relatively laborious, it is adequately explained in the manual (or rather manuals, since the 2094 manual makes many references back to the old 2090 controller manual). On the other hand, software documentation is poor. The manual dives straight in with descriptions of MountList entries, cylinder numbers and so on. A thorough understanding of both AmigaDOS and hard disks is required to make sense of it all. As with all the disks reviewed, however, the 2094 comes ready-formatted and with Workbench already installed.

Software is activated by clicking on the relevant icon from Workbench. From here it is possible to prep the disk (let the disk know how many partitions are required, etc), perform a low-level format, format any of the partitions and install Workbench. Each program opens up a shell window to run and takes user input by a question and answer process. To change the size or number of partitions, the mountlist entry on the initialisation disk must be altered. This involves calculating by hand the start and end cylinders of each partition and possibly creating entirely new entries if more than three partitions are required.

Having formatted the disk, it is necessary to reboot. Then the installation program can be run to copy Workbench on to the disk. Here, the setup is slightly different from that of the other systems tested. The documentation states that it is not possible to use the Fast Filing System on a boot partition. What normally happens is that the boot partition is relatively small, holding the bare minimum for its startup script to pass control over to the Workbench partition where most of the system's software resides. Despite this, every other drive we saw managed to use the Fast Filing System on the boot partition. Consequently, the speed results for the A2094 are quite a bit lower than those of the other drives, since all our tests were performed on a 10Mb boot partition. In practise the results might not be so bad.

CHECKOUT

Speed......................4/30
Appalling, but would be better with FFS in a non-boot partition.

Construction..........11/20
The controller card seems remarkably cluttered. It is slim, so it doesn't obscure any other expansion slots, but space has to be found for the drive itself.

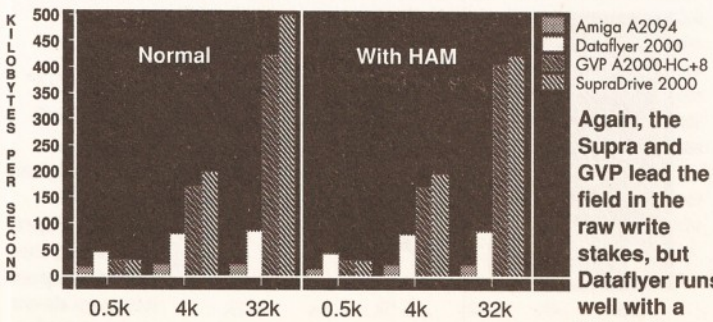
Software.................6/25
Limited and user-unfriendly.

Documentation........9/15
Plenty of information, but beginners may find the manual on the impenetrable side.

Ease of Installation..6/10
Involves the most work of the lot, since the drive has to be mounted separately.

Overall................36/100
You would have to be a particularly keen Commodore supporter to choose this drive.

SPEED TEST 2000 ● SPEED TEST 2000 ● SPEED



Again, the Supra and GVP lead the field in the raw write stakes, but Dataflyer runs well with a 0.5k buffer.

Figure 3

continued on page 24

continued from page 23

Commodore A590



Commodore has done jolly well with the A590. It may not whizz about like GVP's jet-propelled number, but it certainly looks cute on the desk.

DRIVE: 20Mb
RAM: 2Mb

Commodore's A590 may be nothing flash, but it has proven itself a trend setter. Since its introduction at World of Commodore in Canada, a whole bunch of clones has appeared and, while most of the A590 clones do the job better, none do it as cheaply. Although it is £299.99, some dealers do it for less and many even throw in extra RAM.

Externally the A590 is roughly sculpted to follow the contours of the machine and, being made by Commodore, it matches the case colour very well.

On the back panel a set of DIP switches determine the configuration settings for LUN and autoboot. These are fiddly to get at but rarely need attention. Also found here is a 25-way D connector for chaining other SCSI devices. Next to the SCSI socket lies the power supply inlet – perhaps its weakest feature because the 5-way DIN plug easy to pull free.

RAM is added in three stages – 512K, 1Mb, 2Mb. Fitting extra RAM is a chore, but fitting the A590 is simplicity defined. Plug in, switch on and you're off. Autobooting is available with 1.3 Kickstart – a feature of the Amiga, not the drive. All units are pre-configured with Workbench, but tinkerers will find documentation better than usual.

CHECKOUT

Speed....................15/30
Not the world's fastest hard drive, but competent nevertheless.

Construction..........15/20
Sturdy build. Tricky RAM upgrade.

Software...............17/25
Intuitive and easy to use.

Documentation......10/15
Good for beginners, but insufficient detail for experts.

Aesthetics................6/10
Good looking, but outmoded.

Overall................63/100
The best budget hard drive around.

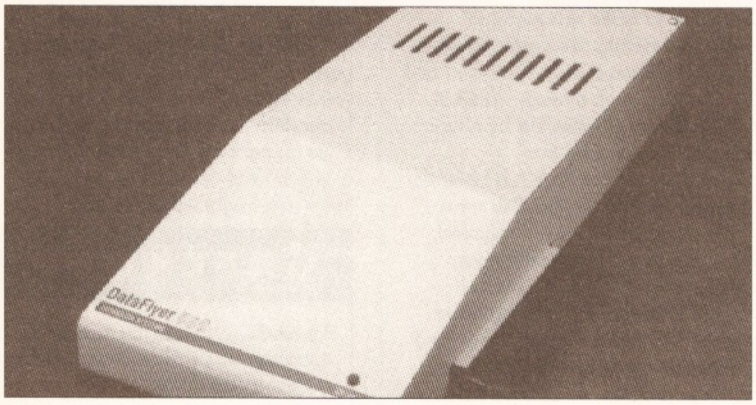
HARD DRIVE CARE

Short of physical abuse, the most dangerous thing you can do to a hard disk is switch on. The second is switch off. This might seem fatuous, but it's true that toggling the power will wreck the structure and give rise to checksum errors.

The watchword here is care. Most drives come with a utility called park. It moves the disk heads to the park cylinder, an area reserved by the disk during prepping and never used by AmigaDOS. Always park the heads before you switch off, putting them out of harm's way when the drive comes back on and the platters start their spin-up phase – the point at which the damage occurs.

Parking is normally only recommended prior to moving a drive. In practice, however, if the heads are left over the surface, the power-up kick can terminally corrupt data. It is very important never to park an auto-parking drive and never attempt to use a park utility designed for use with a different system.

DataFlyer 500



When it comes to high performance data storage, you need to look much further than the DataFlyer. Not the best drive in the world.

DRIVE 49Mb
RAM: requires extra card

The DataFlyer system can be summed up in two words. Oh, dear. What probably started out as a great idea has resulted in something that belongs in a garage. Everything about the system has an unfinished feel to it; it certainly does not belong next to an Amiga of any description.

At first glance it almost looks acceptable. The anodised cream is well matched to the machine and raked to mimic the Amiga's keyboard. It starts to go downhill from there. Various drillings and cuttings have been made for future additions but they have not been blanked off. This much we could live with. The sticky tape insulating the

continued on page 29

CHECKOUT

Speed....................20/30
Hardly outstanding, but competent

Construction............5/20
Tough metal case, but a shoddy design with a home-made look.

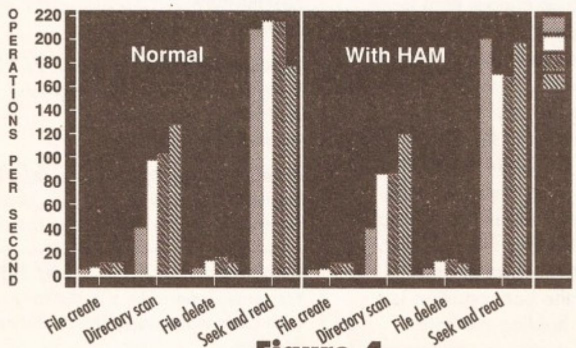
Software.................5/25
It works, but that's it.

Documentation........3/15
Thin, poorly written and poorly produced.

Aesthetics................1/10
Ugly.

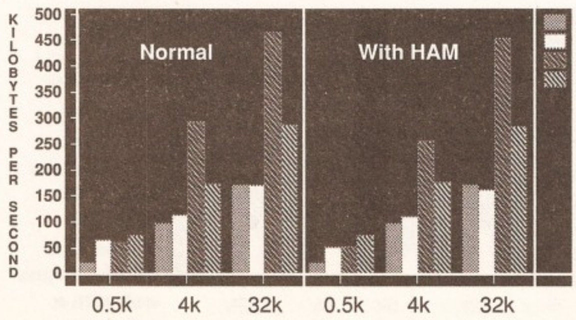
Overall................34/100
This cheap and nasty design has little in its favour.

SPEED TEST 500 ● SPEED TEST 500 ● SPEED TEST 500 ● SPEED TEST 500 ● SPEED TEST 500 ● S



There was little in it as all A500 drives turned in a fairly even showing for the file handling and directory access speed shakedown.

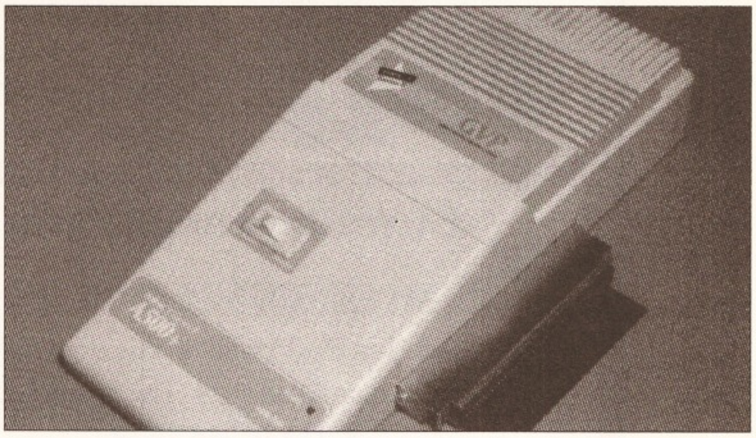
Figure 4



The GVP left the rest for dead at higher buffer sizes, with the Supra 500 taking the raw read speed honours down there at 0.5k.

Figure 5

GVP Impact II+



GVP turns in GTI performance with this stormingly fast drive, combining looks, design quality and speed enough to frighten your granny.

DRIVE: 50Mb
RAM: 8Mb

GVP's little drive is everything the A590 could have been if the technology had been around when it was designed. When not connected to the machine, it resembles a piece of Wensleydale (yummy). Once fitted, it becomes difficult to tell where the Amiga starts and where the drive begins.

Boot this beast up and hold your breath. As the machine fires into action, a dull chattering can just be heard over the noise of the turbo at the back. Like the A590, the fan is mounted precariously about half-an-inch below the grille. It is unlikely a child could jam a finger into it, but there is more than enough room for a terminal screwdriver.

GVP claims this is the fastest hard disk in the world and none of our tests could prove that wrong. Not only is it fast, it's quiet too; one of the quietest tested. It is far from silent and the game switch atop does not stop the noise – just prevents the drive appearing on the bus.

The documentation, although not the worst we had ever seen, was more than a little vague.

Three screws hold the RAM cover in place – one fore and two aft – not five as mentioned in the manual.

Installing RAM should be a piece of cake. Unlike the A590, the GVP unit has been designed to take up to 8Mb of RAM in easy-to-fit SIMM modules. The only problem with this approach is SIMMs are still difficult to come by – even GVP admit, the 4Mx8 versions are rare. This is a bind for real power users because the upgrade from 4Mb to 8Mb means throwing away the old chips.

CHECKOUT

Speed....................29/30
Any faster and it would take off.

Construction..........17/20
A brilliant design.

Software...............20/25
Not as strong as Supra's but good.

Documentation......12/15
A bit thin for beginners.

Aesthetics................9/10
The best looking A500 hard drive yet.

Overall................87/100
Untouchable. THE choice.

Supra 500XP



Great software and documentation, plus strong construction almost make up for the potential PSU-frying antics of Supra's 500XP.

DRIVE 40Mb
RAM: 2Mb or 8Mb

The Supra Corporation has a reputation for making good, solid kit and the 500XP is no exception. Another one of the A590 clones, this one is housed in a solid metal box that looks ready to take the knocks. Unlike the A590, Supra's unit is designed to sit back from the computer. This prevents it interfering with a typist but it can get in the way at the back.

At the rear of the case is the now almost obligatory 25-way D connector and power socket. The DIP switches have been moved to the side on this design – just accessible when the unit is mounted, but only just. These determine the SCSI address of the drive, the autoboot and, unusually, the RAM disable.

Also on the back is an unmarked toggle switch. This turns out to be the game switch which disables the drive when not in use. This is a fine idea, but those investigative pinkies could all too easily knock it to the wrong position. By comparison, the GVP's switch is much easier to foul, but more easily spotted.

So how did it run? For a while we thought the machine had been damaged in transit because the Amiga pointedly refused to boot up when the thing was hooked on.

Despite the fact the test Amiga was running with a 650W PSU, the Supra refused to boot until we fitted an external power source.

Of the drives tested, Supra's had by far the best software and superior documentation. A unique feature was a bus throughport, making it possible to chain other drives and RAM expansions to the machine. On the down side, this drive should be supplied with an external power supply as standard (see *Power Sauce* on page 29).

CHECKOUT

Speed....................22/30
Acceptable, but not outstanding.

Construction..........17/20
Solid metal case and good internally.

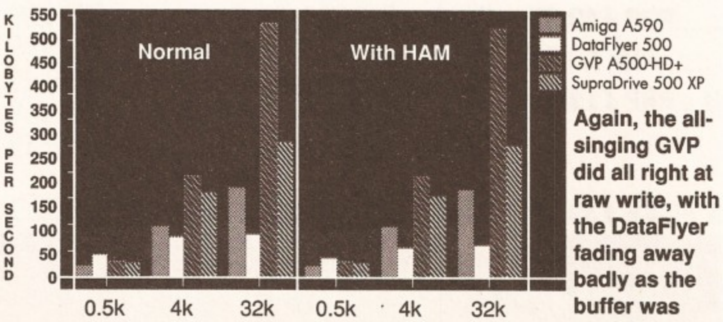
Software...............24/25
Excellent – best of the bunch.

Documentation......14/15
Well produced and easy to follow.

Aesthetics................4/10
OK, but the A590 looks better.

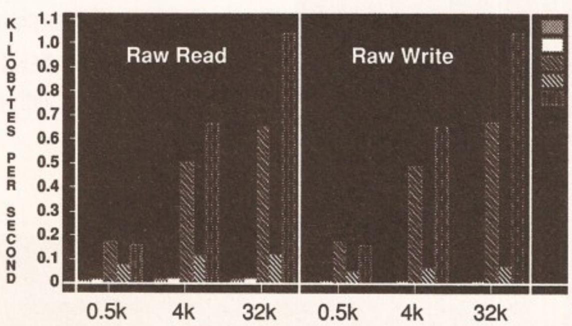
Overall................81/100
Well supported. Not amazingly quick .

SPEED TEST 500 ● SPEED TEST 500 ● SPEED TEST 500 ● SPEED TEST 500 ● SPEED TEST 500 ● SPEED TEST



Again, the all-singing GVP did all right at raw write, with the DataFlyer fading away badly as the buffer was cranked up.

Figure 6



Now compare how other devices fared in the raw read and write tests. Notice the difference between RAD and RAM.

Figure 7

continued on page 29

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POWER SAUCE

When the Supra drive refused to boot up under the A500's own steam, warning bells started ringing – especially since the PSU is only rated for one external floppy drive. In search of the definitive answer, we contacted Commodore for advice. They very obligingly informed us. "The expansion port can supply external devices: +12 volts @ 300mA and 5 volts @ 50mA. There is a -5V line, would you like that too?"

Then we inquired what would happen if we put a hard disk drawing a couple of amps on the bus. They told us, "You might get away with 600mA [about two thirds of an amp] if you don't have an A501 and a external drive. Any more than that and not only will you fry the PSU, but you'll also invalidate the warranty."

This warning should be taken very seriously. Commodore says that if you want to add loads of hardware, then it must operate under its own power. The Supra 500XP and especially the DataFlyer are serious culprits and should be avoided unless you have a replacement PSU capable of supplying the juice.

continued from page24

expansion bus we could not. This rather dodgy situation takes the beast straight from unprofessional to amateur – without passing GO.

Internally the design is nice, clean and uncluttered. An IDC bus at the back accepts most SCSI drives.

Ours was fitted with a power-hungry Segate ST-157, something straight out of cheap PC land. Unlike all the other drives in the test, the DataFlyer does not feature an external SCSI or any space for expansion RAM. Apparently these are actually available, but at extra cost. An external power module also costs more. Someone has obviously overlooked that problem with the power drain on Amiga 500s.

The software is crude, almost to the point of being primordial, and the manual little short of diabolical. Even though there is no cooling fan, this was also the loudest drive subjected to test. It seems a shame to end a review this way, but the message is, for those on a budget this is one drive that should be avoided. AS

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(A500) GVP IMPACT II+ 50MB

Superb build, excellent aesthetics and blinding speed make this the best A500 drive featured. And from what we saw, it will take some beating. The only choice for the power user with money to burn.

(A500) COMMODORE A590

No, we have not gone totally potty. It's slow and only offers 20Mb of storage, but it's a good workhorse for under £300 and guaranteed to be 100% reliable with other Commodore kit..

● 2000 ● 2000 ● 2000 ● 2000 ● 2000 ●

SUPRA WORDSYNC 2000

It is the fastest drive we tested, comes with plenty of storage for the price, and it all fits in a single expansion slot. It comes with versatile, user-friendly software too. What more could you ask?

GVP SERIES II A2000 HC+8

The review model had a 173Mb drive, but Power sell a 40Mb version for £399. It performs almost as well as the Supra, is supported by good software, and has the capability to add RAM onboard.

HARD DRIVE SPEED TEST RESULTS

Drive	Format 10Mb Partition (secs)	Cold Boot (secs)	Load DPaint III (secs)
A2094	605	35	9
DataFlyer 2000	245	40	3
GVP 2000	110	40	2
SupraDrive 2000	N/A	45	3
A590	205	45	3
DataFlyer 500	240	35	2
GVP 500	520	23	1
SupraDrive 500XP	N/A	58	2

SIZING UP

DIMENSIONS (mm)

Drive	Length	Width	height
A2094	N/A	N/A	N/A
DataFlyer 2000	N/A	N/A	N/A
GVP 2000	N/A	N/A	N/A
SupraDrive 2000	N/A	N/A	N/A
A590	260	112	65
DataFlyer 500	377	145	62
GVP 500	330	135	62
SupraDrive 500XP	285	107	60

THE TESTS

Unlike floppy drives, the hard variety perform at differing speeds depending on the disk controller and the actual disk drive supplied with the unit.

See the figures for how the drives performed. The first thing was to measure the time taken for a low-level format. Normally, hard disks are supplied already formatted, with Workbench and Extras (and sometimes some manufacturer specific tools) installed. But in some cases it might be necessary to re-format: ie, if you need to change the number or size of the partitions. The timings for the format are given in seconds per 10Mb, since larger drives obviously take longer to format.

The time taken to format and initialise a boot partition of 10Mb – the partition where all subsequent tests were performed – was also measured.

Having done this we installed Workbench on the partition (each of the models come with software to do this) and measured the time taken for a cold boot from the hard disk.

To simulate the performance of the drives in everyday use, we used DiskSpeed 1.0 by Michael Sinz of MKSoft Development. This creates 256 files on the disk; scans the resulting directory list twice, and then deletes the files, taking timings for each in terms of number of operations performed per second. A seek and read test is then executed, whereby a 256k file is created and sections of data at the beginning, middle and end of this file are sought and read 150 times each. It also tests the speed at which the drive can write and read raw data. Results are given in number of bytes read/written per second.

Once these tests were done, we ran them again but this time with a HAM picture at the front of the screen. The reason for this is that the custom chips have to do a lot of work to display a HAM image, and there will be some contention between them and the hard disk for access to memory.

Finally, we measured how long it took for a typical program to load from each drive. For this we chose *Deluxe Paint* III.

Best Expanders

Expansion slots on an A500? Surely not. But oh yes indeedy as Phil South stretches his Amiga with the Bodega Bay and Checkmate Digital expanders

The big problem for A500 users after they've used their Amiga for a while is that they feel the need for more. Yes, more. More of everything, more expansion possibilities, more memory, hard disks, 24-bit graphics, video toasters ... the whole bit. But owning a machine in which the only real internal expansion options are whatever you can fit into the trapdoor can be rather limiting to their aspirations.

But as is usual in these things, people are out there using their noddles and making the best of a bad job. First came the Checkmate Digital 1500, now we have the Bodega Bay. Where will it all end? Could this be the death of the 2000? Let's take a look at the options and find out.

Bodega Bay

Most people were only really aware of the Bodega Bay when the ad came out in the American Amiga mags. A strange box that makes your Amiga look like an old Apple III? How silly. But reading the specs alongside the picture soon changed my mind. It's boast is to (nearly) bring the A500 up to A2000 specification. The brackets around the word 'nearly' are there because of a small asterisk by the full spec in the ad, which says that video slots are coming along later. Hmm. Does this mean that the Bodega Bay is half a solution? Nah, there's much more to it than that. Now the Bodega Bay is in the UK, via the Amiga Centre Scotland, and that means we can take it apart and give it a good old-fashioned shakedown.

The Bodega Bay is a large box, a little bit wider than an A500, which stands off the floor enough for you to get all but the keyboard of your Amiga under it. A prong in the left hand side of the Bodega Bay goes into the expansion slot in the side of your 500 and the whole thing snaps together. The foot on which the Bodega Bay stands has a sort of lip which goes under the 500 meaning that, once the thing is attached to your Amiga, you can pick the whole bundle up as one without the Amiga falling off the bottom or bending the slot.

The unit itself is a metal box, inside which is a nice strong power supply from which you can drive your Amiga, monitor and the stuff in the Bodega Bay. The Bodega Bay contains four card slots, some of which are PC compatible, and a 5.25" disk drive. If you have a bridgeboard in place, this means you can use big PC disks and run PC flavour fax cards. Very nice.

There is space in the Bodega Bay for another external disk drive, so you can use this as df1: or df2: depending on whether you've got your first external pressed into the drive slot on the back or not.



Styling on the Bodega Bay is not exactly avant garde, but then have you noticed how dated certain computers are looking these days?

Smart looks

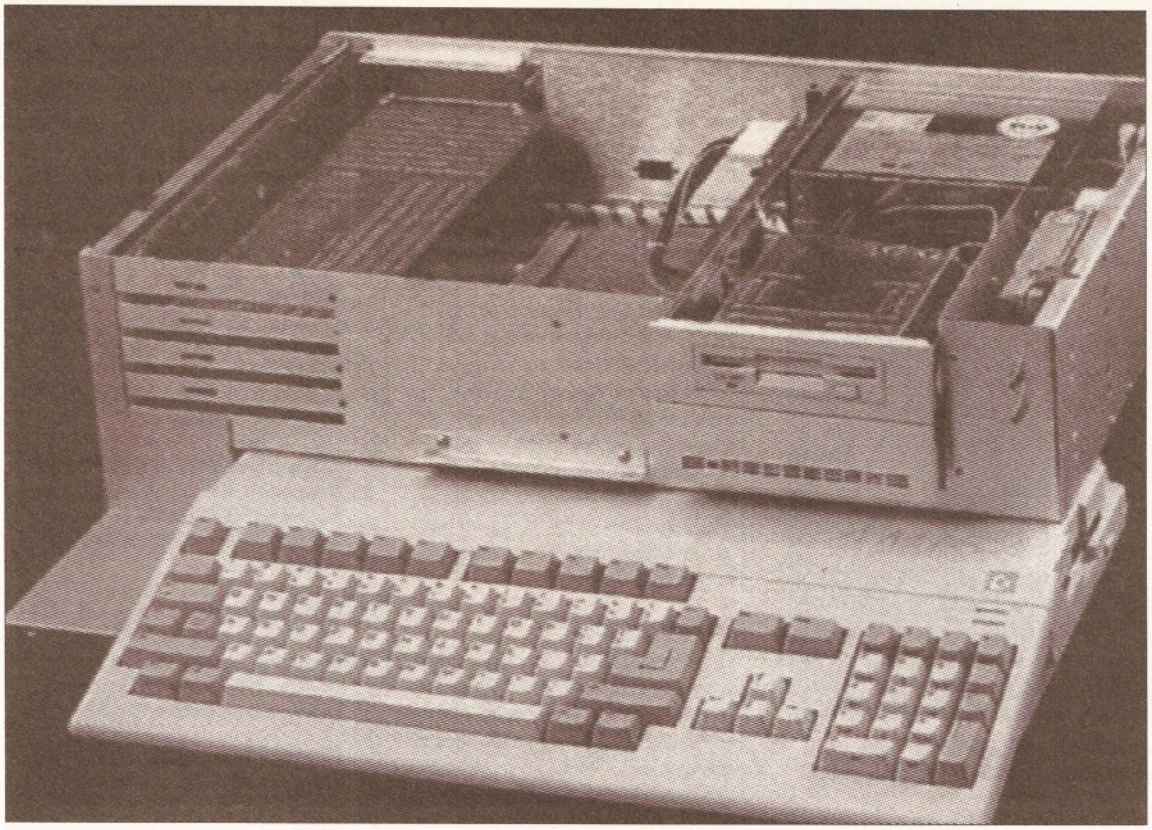
When it's fitted together the whole thing looks very smart and very distinctive. Its metal case is fronted by a plastic fascia, which slopes sexily down to meet flush with your keyboard. The metal top is strong enough to take the weight of a monitor, so all together it's very posh. You get a flying lead with the system which goes into the back of the Bodega Bay and out to your Amiga power supply socket. The same goes for the monitor, so you can switch the whole show on just by flipping the switch on the back; the one over on the right hand side. On the foot that takes the weight of the Bodega Bay on the right, there are a couple of joystick connector-shaped holes which, with a pair of flying leads (not supplied in my demo unit), could pull the mouse and joystick ports round to the side within easy reach.

There is a fan inside the unit to keep the old power supply cool. The supply has a little toggle switch marked 110v and 230v which I should imagine on all units they ship in the UK will be switched over before they go out.

The unit is undone for the fitting of cards and extra drives in the same way as a PC or a 2000. Retaining screws on the back of the box are unscrewed and the top of the unit slides forwards revealing the shiny metal innards. On the left of the box inside, as you look at it from the front, is the circuit board containing the card slots, four in all. This board goes down to a complex connector under the unit which feed the data to and from the expansion port. To all intents and purposes, the unit is invisible to the Amiga, appearing to the machine like an extension of the normal circuits in the machine. As the unit is plugged right into the bus, there is intrinsically no difference in performance between the Amiga with or without the Bodega Bay.

> ***"The unit's PC bridgeboard does its PC thang in a slow and crunchy way and the 5.25" drive whirrs away like it is meant to."***

The four card slots have openings at the back of the machine, not unlike a 2000, in case any of the cards you slot into the machine have ports out the back. There are a couple of empty holes in the back, one the size of a joystick plug, the other more like a 25 way RS232 plug. What these are for wasn't obvious and, as the docs had vanished by the time I got my hands on the thing, this will remain a



The unit makes a basic Amiga look pretty small, but the expansion possibilities are huge. Prospective PC users will find the internal roominess an advantage and some mysterious extra holes in the case look promising.

mystery for the time being. Three of the slots are PC XT/AT compatible, so you could plug in a EGA or VGA card to get your bridgeboard display more smooth and PC-like. (It's a bit juddery on the Amiga window.) You can even slot in PC Fax cards, which are very cheap, and this will get around one general shortfall in Amiga peripherals; there ain't a viable alternative on the Amiga to cheap PC cards. Having a machine with slots gives you more than just possibilities (a very vague term, I find), it gives you power to expand the technical limits of your machine, with not only the wide range of Amiga cards, pretty amazing in themselves, but PC cards as well. This makes the box even more of a bargain than it was already.

Fitted bridgeboard

The unit I was supplied with was ready-fitted with a Bridgeboard – the jolly old Commodore PC on a board which enables you to run PC software on your Amiga, albeit a little bit slowly. This board is attached internally to the 5.25" disk drive via a nice thick ribbon cable. (As a point of order, you needn't use up one of your slots on a Bridgeboard as, don't forget, the KCS system fits into the standard A500 trapdoor, so you already have the capability to have PC software up on your Amiga. Bridgeboards are nice for running PC cards though and, as I said just now, this is very handy if you want to really go places.

Conclusion

As this is a plug and fit expansion, there really is nothing to go wrong. No moving parts means nothing will wear out and the whole thing comes out just a little bit too good to be true.

In use, the unit performed flawlessly. The PC bridgeboard did its PC thang in its slow, crunchy way and the 5.25" drive whirred like it should do. I am really at pains to find anything that wrong with the damn thing. But being the kind of guy I am, I'll have a good try.

So, on the nit-picking front, it is a bit of a shame that it takes up the expansion port, as this removes the possibility of using the nice cheap A590 disk drive, or indeed anything else which might be of use, like a snapshot cartridge. Although having access to cards and big disk drives is certainly an inducement, you are making your Amiga more than a little harder to get at. Don't underestimate the effort involved in opening and closing the box, and the access to the back of your machine is severely restricted. Just try leaning over your table to change the modem plug in the serial port for the MIDI interface or the printer lead with your scanner/sound sampler. You'll soon find out that owning a dirty great big box with a computer in it is not all beer and skittles.

But these reservations aside, you won't find a great deal to grumble about in the Bodega Bay. It is very good looking, sturdy and, for what it is, pretty damn cheap too.

CHECKMATE DIGITAL

Despite nasty rumours to the contrary, Checkmate Digital is still very much with us. The company that practically invented the expansion box market in the UK is still coming up with innovative ways of making your basic A500 go much, much further.

The company's policy has always been that the 500 is all the computer you'll ever need, so why bother going to anything else? The workstation concept that the company espouses is taken to its logical extreme with the first product, released last year, called the Checkmate 1500.

The Checkmate 1500, not to be confused with Commodore's silly sticker-covered A1500, is a metal box which allows you to slip the A500 out of its plastic casing and into a much more slim-line, rugged affair. The keyboard is put in a slim

continued on page 32

CHECKOUT

Bodega Bay

Ease Of Use............8/10
Fitting the thing is a piece of cake, though you may find the strain on your back too much when it comes to reaching the back of your Amiga under all that metal.

Speed 9/10
There is no slowdown in operation in using your Amiga, as all the bits connected to the Bodega Bay are invisible to the system. Damn smart that.

Construction 7/10
Good, solid construction overall, though the plastic bits like the foot covering the edge connector are liable to break off under the weight of the case if you let it drop on it. So the case is fine, it's just the trimmings that are a bit flimsy.

Connections..........10/10
The Bodega Bay is well connected to the outside world and if the rumoured video slot and co-processor sockets come out as predicted, the unit will practically be an A2000.

Expansion............10/10
The expansion possibilities are very good, giving you access to a range of cards in both the Amiga and PC fields. There are also some nice undocumented holes in the case which promise further customisation will be possible in future.

Good Looks............6/10
Good looking in an old fashioned sort of way. Nice use of the plastic surround to iron out any rough metal edges, but the trim was a tad flimsy and not very well fitted to the metal. The problem there is that if you plan to lug it about, bits may break off and start to make it look shabby.

Use Of Amiga 9/10
The Bodega Bay sets your A500 free to explore strange new vistas, seek out new cards and applications, to boldly go where only a few more expensive computers went only last week.

Documentation.......3/10
There wasn't any documentation in my test version, but to be honest you don't need any. If someone gives you a shovel and a large pile of manure, explanation seems fairly unnecessary.

Price Value...........18/20
As far as expansion boxes go, this is about the ballpark price. It's worth about £300 in my estimation, so whack on £50 for shipping it over from the US and you've got a good deal. It's cheaper than trading up for a 2000 anyway, and memory expansion and memory expansion and hard disks are cheaper on the whole if you know the right places to look.

Overall 80/100
A very good idea and very well executed. The best thing about it is that it takes you 10 seconds to fit and lasts as long as the computer does. What can you say *that* of these days?

continued from page 31


Checkmate's 1500 is still going strong – strong being the operative word. Ham-fisted owners will be hard-pressed to make an impression.

box on a curly lead coming out of the front, and the internal disk drive is turned 90 degrees to face front. Inside the case, using a special adaptor board, the user can fit the guts of an A590 20Mb hard disk drive/memory/SCSI controller, making it a much more compact and sexy workstation. It's much slimmer than a 2000 and inside there is room to fit all manner of interfaces and devices. In looks it is more like a cross between the old Amiga 1000 and a Sun SPARCstation or something similar.

To open the unit all you have to do is undo the retaining screws and the bottom of the box (called the tray in the trade) slides out. The box is an all-metal construction, painted with a very nice Hammerite-type, light grey paint. Stickers marking it as a A1500 are positioned on the front left of the box and on the keyboard. All the ports and stuff still stick out of the back like they ever did, except now they are nice and low down and are protected by the lip made as the back of the top curves down and back the to side of the tray.

The joystick and mouse ports are extended on little internal leads to poke out of the front. This is very convenient, as one of the greatest bugbears of an Amiga user's life is switching plugs at there rear of the machine. This facility cuts out one of the regular culprits.

Conclusion

I've actually used a Checkmate box since they came out, and although I've had some problems with it, these are mostly due to the fact that it is a prototype unit. Production units were much sexier-looking and much more reliable. Although Checkmate's focus of attention is it's new products now (see Checkmate's Near Future), it will continue to support the 1500 until it is a complete system with slots.

The only drawbacks are to do with not having the expansion slot free if you have the 590 fitted internally, and not having enough headroom over the processor to fit other types of boards. But this is a small niggle and is far outweighed by the benefits.

As an example of the quality of goods Checkmate is capable of, the 1500 says a lot of this young but very shrewd company. It was a bold plan to completely re-box the Amiga, and it's execution was perfect. Fitting the unit around your motherboard isn't that hard – I'm terrible when it comes to these things – and I managed to do it without cracking the board in half. If a klutz like me can do it, then so can you. AS

Checkmate's Near Future

To make the system compatible with Amiga cards and other peripherals, the company plans to release what was once called the 'top box'. Instead of a separate box on top of the unit, the company is now planning to supply a bigger top for the case, expanding the size of it upwards and having the slots fitted internally. This will probably happen sometime around late Summer.

But before that, the new Checkmate box - IQLR500 tower case - will be coming out this Spring, probably in April. The price is not yet fixed, but Checkmate's Steve Jones puts it in the region of £350-£400, which sounds very sensible. The new box is a tower, so it stands on its end on the floor, and as well as a new sexy separate keyboard case, it has (and I stress this spec is preliminary):

- **4 Amiga slots**
- **1 slot for your A500 motherboard**
- **A full length video slot**
- **5 disk bays for either 5.25" or 3.5" drives**

plus enough headroom over your processor to fit accelerators/emulators, room for your 501 board, and an integral chunky 220w power supply. (Phew) The Checkmates were showing the unit at the recent AmiExpo in New York, and it looked nice and strong and very smart.

Give Checkmate a call to checkout the latest specifications and its availability.

Shopping List

Bodega Bay..................£350
Amiga Centre Scotland
4 Hart Street Lane
Edinburgh
EH1 3RN
☎ 031-577-4242

Checkmate A1500 ....£199
Checkmate Digital
80 Mildmay Park
London
N1 4PR
☎ 071-923-0658

Checkout

Checkmate Digital

Ease Of Use............8/10
Fitting the motherboard in the box is tricky, but even a child could do it with supervision. You have to mind out for the sharp metal shield in the Amiga itself but the hazards really end there.

Speed 9/10
The case doesn't impair the speed of your Amiga or the 590. In fact, if you add one of the SCSI drives that Checkmate can fit you out with, it positively flies along.

Construction 10/10
The rugged, all-metal construction means that your Amiga becomes big, butch and as strong as a safe, so very few worries there.

Connections..........10/10
Checkmate is continuously updating and expanding the possibilities of the machine. Fitting some of your more frequently used interfaces is child's play.

Expansion 10/10
You can fit any of the known expansion boards internally to the unit and, of course, all the usual stuff that fits into the trapdoor can still fit, so the possibilities are limitless really.

Good Looks............9/10
It's a slim and sexy unit, so no complaints there. It drops a point for looking a little too rugged in the wrong light, but if you are planning to knock your Amiga around a bit (got to show it who's boss) then you are onto a winner.

Use Of Amiga 9/10
Removes all the problems associated with owning a 500 and replaces them with only a few drawbacks. Sets your 500 free of it's gaudy games machine casing and adds the welcome possibility of more of everything.

Documentation 8/10
A full set of instructions is included for the brain dead and generally hard of thinking, but I bet you could probably work out how to set the unit up if you tried without consulting them.

Price Value...........18/20
Can't really be beaten price-per-ounce on metalwork. The price is low for what you get, and good expansion options and new products from Checkmate will no doubt reflect a similarly competitive pricing strategy.

Overall 91/100
A first-class bit of kit and one which you will not regret investing in. It brings a few minor and transitory problems, but these are outranked by the many benefits of having an all-in-one workstation. If you want everything in one place where you can get at it, then this is the kiddy.

Distinctly Digita

Cleverly written and always favourably reviewed in the press, Digita produces a range of powerful, low cost software for the home and business user.



DGCALC

The fastest and most powerful spreadsheet available in this price bracket, with 512 rows by 52 columns, giving you up to 26624 cells. As with all Digita products, the operation of the program is clearly thought out. Being either menu, mouse or command driven you'll be able to start using it within minutes – even if you've never used a spreadsheet before. Some of the features which make it such good value are the exporting of ASCII files for integration with other programs, adjustable column width and text overflow, programmable function keys (macros), and a unique windowing facility, so that you can look at different parts of a sheet at the same time.

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OK Punk ... Make My Page

Gold Disk's* Professional Page *DTP package has reached version 2, with extra features, higher performance and a higher price.* JEFF WALKER *examines what can be had for a few dollars more

Different people want different things from desktop publishing programs. At one end of the scale there is the simple black-and-white letterhead, at the other end the full-colour, many page brochure or magazine. In between there is a whole mish-mash of needs – the leaflet, the advert, the local church magazine, the company report, the housing estate newsletter...

Time is money

A prime requirement, then, of any desktop publishing program is versatility. But it is no good a program being able to do everything a user may require of it if that program becomes so complex, as many do, that the user has to keep digging into the manual. The usual developers' excuse that complexity is the price you have to pay for versatility simply doesn't wash when time is money – especially if it's your time and your money.

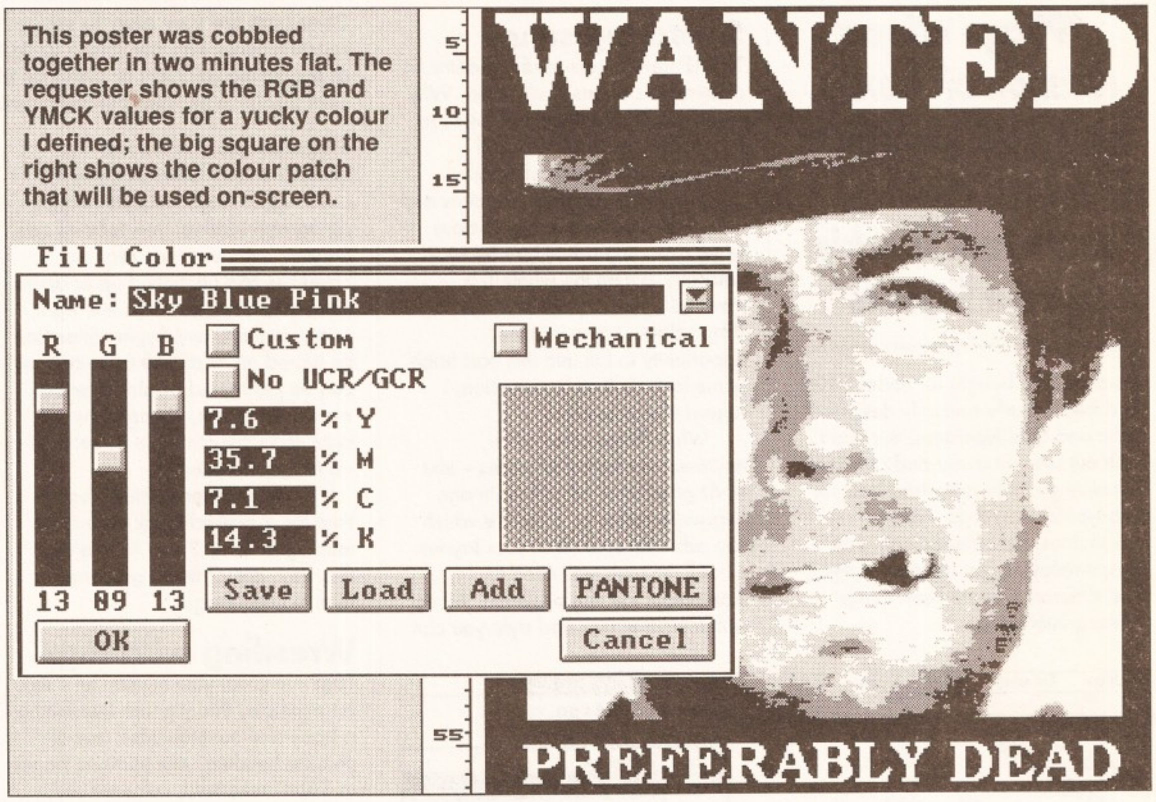
So the other prime requirement of

"I am certainly not overestimating your ability when I say that pages can be created within PPage in a very short time"

any desktop publishing program is ease of use. More than that, it needs to be intuitive – you should be able to do things the way you would expect to do things. This is a two-pronged fork. Because the program is running on the Amiga it means that Commodore's user-interface guidelines need to be adopted, and because many users may have moved to desktop publishing from traditional publishing methods, the traditional publishing conventions need to be adhered to as well. *Professional Page (PPage)* fills all these criteria admirably.

Enter v2

PPage 2 feels like a total re-write. (The latest version at the time of writing, and the subject of this article, is v2A.) Although Gold Disk has quite rightly stuck close to the v1.3 user-interface, certain things have changed which may make getting



This poster was cobbled together in two minutes flat. The requester shows the RGB and YMCK values for a yucky colour I defined; the big square on the right shows the colour patch that will be used on-screen.

used to the upgrade a more arduous task than it has been in the past. But changes haven't been made for the sake of it, only to make operation easier or more intuitive.

At its simplest level, creating documents in *PPage* involves nothing more than arranging a number of boxes on a page and then filling them with either text or graphics. Boxes are created by selecting the box tool, moving the pointer on to the page, holding down the left mouse button and dragging the outline of the box until it is the size you want it.

To put text in a box, select Project/Import/Text, load in your text file, select the text tool, click in the box where the text needs to go and select Edit/Paste. To put a graphic in your box you first click in the box, which should hold the graphic, select one of the four supported formats – bitmap, *Aegis Draw*, *PDraw* or Encapsulated PostScript – from Project/Import, and in it loads.

Now all you need to do is move the boxes into the exact positions you want them and your page is finished.

Rapid reports

I am certainly not over-estimating your ability when I say that pages can be created within *PPage* in a very short time. The tutorial in the manual – the front page of a newsletter with two columns of text flowing around a centralised graphic – takes about half-an-hour to follow through; once you have completed it you will be able to do the whole thing again, without the aid of the manual, in about five minutes. Honestly, simple stuff like this is like falling off a printing press.

Working in its single bitplane (black-and-white) mode, the program runs at an acceptable pace. Various tricks can be adopted to quicken its use, which admittedly makes the display less and less WYSIWYG (What You See Is What You Get), but when you become more experienced in desktop publishing you will find that you don't actually need to see every single detail of the page all of the time – after a box has been pasted-up as required there is not much point in having a WYSIWYG display of it.

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To aid production further, screen refresh can be halted by hitting Esc, which will probably become the most-used key on your keyboard.

Sizing it up

Text in *PPage* can be of any size from 2pt to 720pt – about 1/36th of an inch to 10 inches. Two Roman (upright) CG typefaces are supplied – one with serifs, in the form of good old traditional Times, and one without serifs (sans serif) called Triumvirate, which is AGFA's version of Helvetica.

Italic and Bold are available from the Style menu, along with Outline and Underline. More CG fonts, 35 of them, can be bought for under £100 and they include specially designed Italic and Bold typefaces. But don't rush out straight away and buy them because you'll be surprised how far two typefaces will go – many magazines, for instance, use only two, employing just different styles and different sizes to keep things looking interesting.

> ***"PPage allows rotation of boxes, text AND graphics, which can add some real sparkle to your layouts"***

PPage still supports its old Amiga bitmapped fonts output. Heaven only knows why; 75 dpi does not even approach anything that could be loosely called professional-looking. However, it's there if you want it.

At this stage it is worth mentioning that in traditional typography the width of a character is designed to be a proportion of its height. So if you change a character's point size, its width remains proportionally the same. For instance, a word which is, say, three inches wide in 72pt in a certain font will be an inch-and-half wide set to 36pt in the same font. If you wanted that word to be three inches wide AND 36pt, you would simply have to find a fatter font.

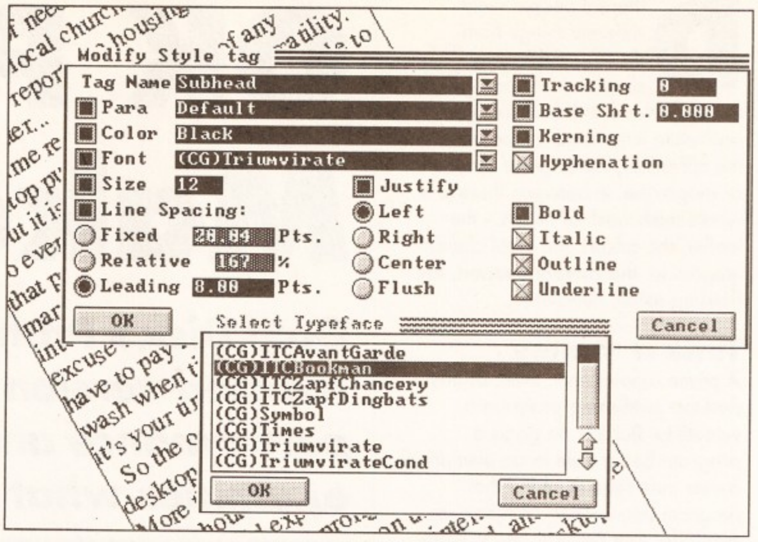
Stretching sense

To DTP newcomers (and *PageStream* owners) this seems a silly idea. Why can't you simply stretch the word to fill the three inches? Well, all typefaces have been purposely designed to be visually attractive and easy to read. There are occasions when distorting a font can be eye-catching, but on the whole it is frowned upon as poor practice. *PPage* doesn't give you the opportunity to fall into this bad habit. Some look on it as a restriction; I regard it as a strength.

What *PPage* does allow, however, is rotation of boxes – text AND graphics – full circle, in one degree increments, a feature which can add real sparkle to your layouts.

All the tools you need to manipulate text are provided. Along with the point size and style you can adjust the colour of the text; the space between letters positively (tracking) or negatively (kerning), paragraph indents; line spacing can be set to whatever you require; baselines can be moved up or down; justification can be set to left, right, centre or flush; and hyphenation can be turned on or off. All these options can be performed on single letters, words, sentences, paragraphs ... right up to the complete contents of a set of linked boxes.

Changing these settings one at a time for a marked block of text can take ages. In v1.3 you had to do it this way, but v2 has a great new feature called tags.



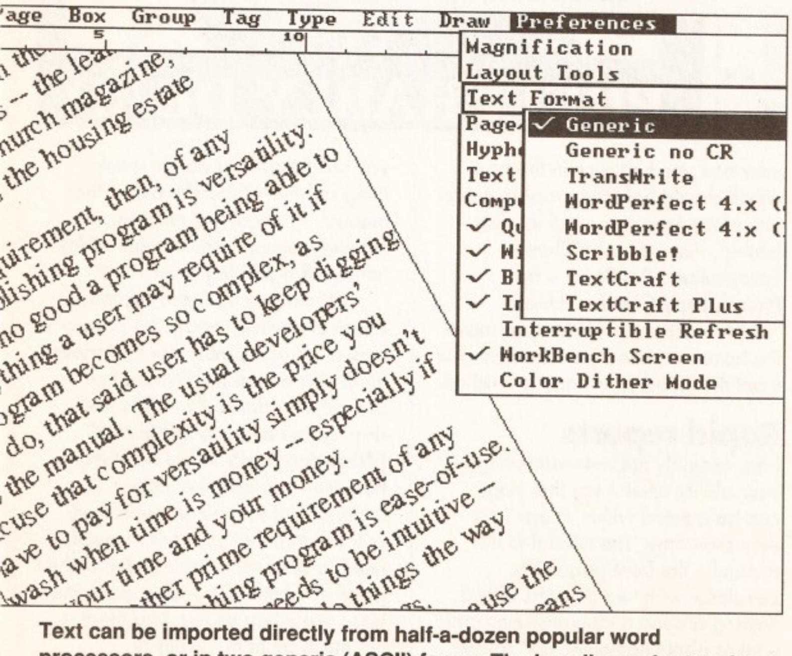
Style tags are very easy to set up. You can either type the names of your requirements into the string gadgets, or click on the buttons to the right of the string gadgets to bring up file requesters. In the illustration above I am about to change the subheading font from Triumvirate to Bookman.

Wrestling with tags

Tags are great time savers. Let's say, for example, that you are typesetting a book and have decided that all chapter headings are going to be set in 36pt Times Bold, coloured red, centred on the page with 72pt (an inch) of line spacing below them. Everything goes fine. You show the proof to the author and he goes crazy because he asked for green chapter headings in 24pt Triumvirate Italic, left justified.

There are lots of chapters in his book. You are sick as a parrot, yes? No. Because you had set up a tag called Chapter Headings which, funnily enough, described all the attributes of chapter headings. All you need do is modify the tag to the author's new requirements and every chapter heading in the document will automatically adjust to the new style.

That's an example of a Style Tag. *PPage* also features Paragraph Tags, so when your fussy author complains later that he wanted his paragraphs



Text can be imported directly from half-a-dozen popular word processors, or in two generic (ASCII) forms. The baselines of rotated text appear wobbly on-screen, but when output they are perfectly straight.

PPage Potted

PPage **is by no means a new program; it has gone through several incarnations. The original program (v1 to v1.2) was only of any practical use with PostScript printers. It did support dot-matrix output, but only at screen resolution – a very jaggy 75x75 dots per inch (dpi).**

The release of v1.3 saw the inclusion of support for AGFA's re-scalable Compugraphic (CG) fonts, which happily meant that output resolution was now limited only by the specification of your printer. Excellent results (360x180 dpi) could be gained with a mere – and by this time cheap – 24 pins hanging off the parallel port, and non-PostScript Hewlett Packard compatible inkjet and laser printers costing less than £1,000 could produce a wonderful 300x300 dpi.

As good as ***PPage*** **1.3 was, and it** ***was*** **pretty good, it unfortunately lacked a number of desirable features. Plus it had an annoying tendency to fall over when pushed.**

JARGON BUSTING

BASELINE: The imaginary line on which sit the bases of all letters without descenders.
BITPLANE/BITMAP: A bitplane is an area of memory where every binary bit corresponds to a pixel on the screen. One bitplane represents a monochrome image, several can be overlayed (a bitmap) to represent a colour image.
CROPPING: Cutting out the part of a picture that you are interested in.
DITHERING: The juxtaposition in varying densities of black and white (or coloured) dots to create a grey scale (or more colours).
HAM: Hold And Modify is an Amiga graphic mode allowing all 4096 colours to be displayed at once, with certain restrictions.
IFF: Interchange File Format is a means by which data from different graphics or sampling programs can be saved in a compatible way.
ILBM: Interleaved Bit Map is the IFF sub-format in which graphics images are stored.
JAGGIES: The jagged edges seen on diagonal lines, caused by the use of small, but nonetheless finite, rectangular pixels to make up a picture.
JUSTIFICATION: The way text is formatted on a line. Right justification results in the text being hard against the right margin, similarly for left. Other possibilities are flush and centred.
POSTSCRIPT: A powerful mathematical langauge used to describe graphics and text images to compatible printers. Because it does not rely on a pixel system, objects can be scaled and rotated without distortion.
SERIF: Typefaces that have little flourishes at the end of letters, eg: Times

indented half-an-inch, not half-a-centimetre, you simply modify your Bodycopy Indent paragraph tag (or whatever else you've called it) and the job's done. Both types of tag can be saved to disk and loaded again for use in another document.

As mentioned briefly above, boxes can be linked together so that when one box is full the text flows automatically into the next box in the chain. Boxes can be linked across pages, and special keypresses allow you to insert the page number which the previous, or next, box is on, making things like "Continued on page..." and "Continued from page..." a piece of cake.

Hacking copy

PPage itself has a very basic text editor which can be used for making simple changes to the words at page make-up time. Operations, like copy, cut, paste, search and replace, work well enough, but for the initial writing/editing and any major changes it's best to use a dedicated word processor.

New to v2 is the addition of a fully-integrated article editor and spelling checker. Typeface styles (bold, italic and so on) embedded in text written with the article editor are in the same format used by *PPage*, so a word you've picked out in bold in the editor will automatically appear in bold when imported to *PPage*. The article editor is simple to use and very quick; if you are using *PPage* a lot it is well worth getting familiar with it in preference to the word processor you would normally use. By far the most useful feature of the editor is that while using *PPage* you can mark a block of text, send it to the editor – which will load in with the text you have marked to be ready for editing – make your changes, check it for spelling mistakes and then send it back to *PPage*, where it will be pasted back into the position it was cut from.

PPage's graphics handling is not far short of excellent. All types of IFFs can be imported – including 24-bit (16.7 million colours) – and once on the page can be cropped, re-scaled and rotated to suit. Loading times vary from very quick for single bitplanes to yawn for HAM, but once loaded, re-scaling is instantaneous and rotation is not far behind.

What you see on-screen is a four-grey-level representation of the graphic when in colour mode, or a dithered representation in black-and-white mode – either way it is plenty enough to see what you are doing, except after a rotation, when what appears on the screen can become severely confused if the graphic contains fine detail. This is actually a Good Thing – *PPage* appreciates that you would much rather get on with the job of laying-out than waiting ages for it to calculate exactly where every single rotated point of the graphic should be.

Despite their appearance on the screen, rotated IFF graphics print out exceptionally well – much better than you would expect – having none of the distortion or jaggies that rotated brushes in *DPaint* are prone to.

Although it doesn't display them, *PPage* remembers the colour details and sends them perfectly to the printer or PostScript file when output.

IFF graphics, being bitmapped, are of course, like bitmapped fonts, restricted by the resolution of the screen – about *75x75* dpi in hi-res mode – and this is the best resolution you are going to achieve with IFF graphics no matter what the resolution of your output device.

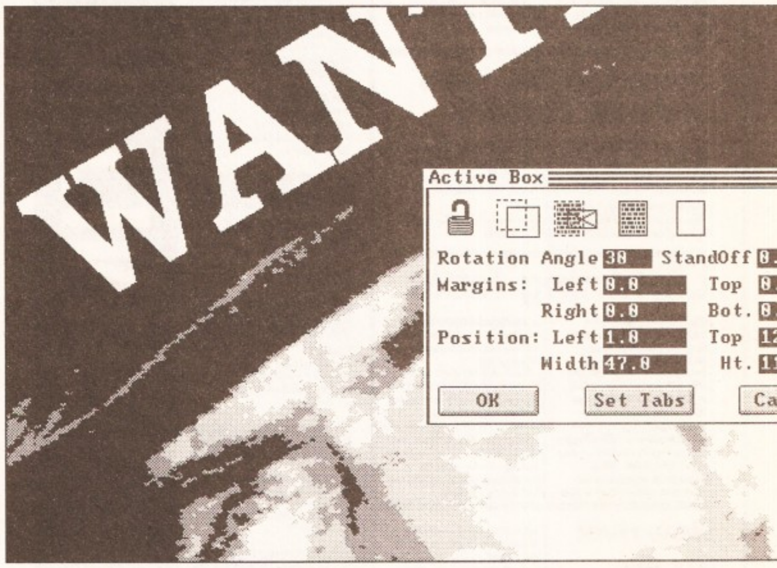
IFFy scaling

Consequently, scaling IFFs up results in blockier and blockier images and scaling IFFs down results in more and more detail going missing. *PPage* cannot be blamed for this; it is a restriction, first of the Amiga's screen resolution and second of the IFF ILBM format which does not contain dots-per-inch information.

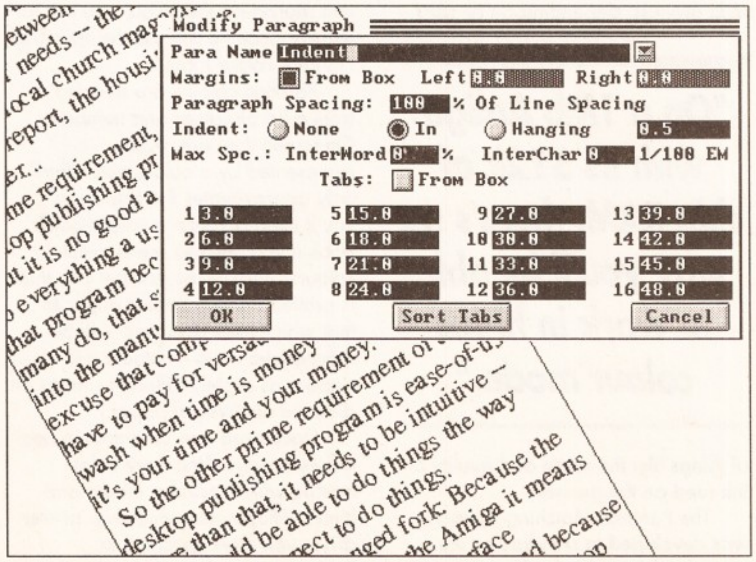
But all is not lost. As well as IFFs, *PPage* can import structured drawings created with either *Aegis Draw* or Gold Disk's own *Professional Draw*. These have the advantage, like CG fonts, of being mathematically described in memory, which means they can be re-scaled up and down, and rotated, with no danger of the jaggies creeping in. And thanks to colour dithering, structured drawings can be displayed in up to 1,000 apparent colours.

Having structured drawings on-screen, even in black-and-white mode, tends to slow *PPage* to a snail's pace, so most times you will work in wireframe mode, where just the outlines of the structured drawings are shown. Even this slows you down, so once you've adjusted your drawing to the required shape and size, you can alter it's box to Quick Display after which the box will appear on-screen with just an X

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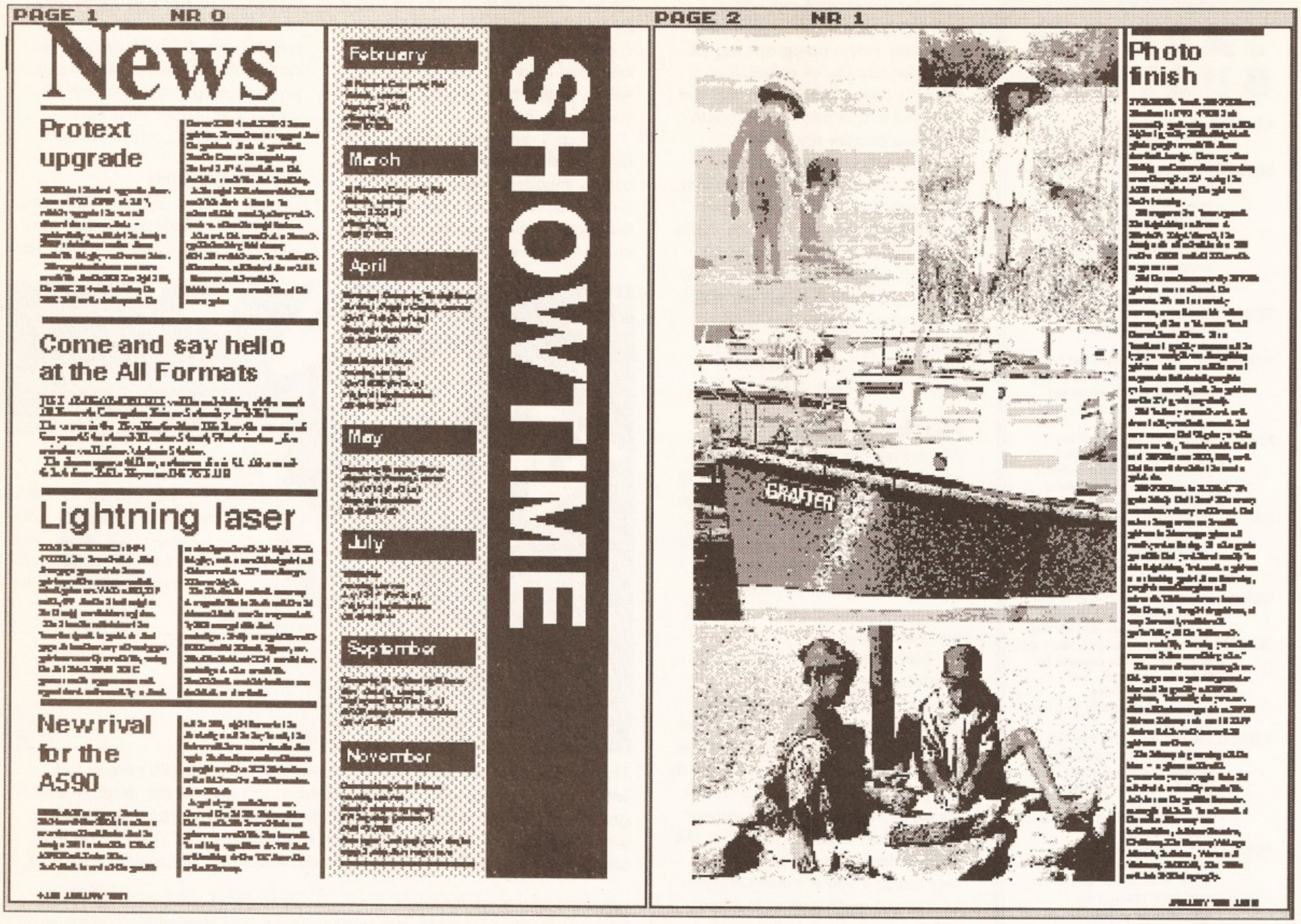


This close-up of the Clint poster shows that you can still clearly see what you are doing with rotated graphics; the greater the detail in the graphic, however, and the more confused the screen representation tends to become. This doesn't affect the output, but it does mean that any cropping and so on needs to be done before the graphic is rotated.



The Paragraph Tags requester includes useful options which enable you adjust the inter-word and inter-character spacing for flush justification.

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A finished spread featuring imported HAM graphics and rotated text. It took a good deal more time to write the copy than it took to lay the spread out.

through it, which speeds things up quite considerably.

When IFF graphics and structured drawings are imported, they will automatically scale themselves as closely as possible to the size of the containing box while preserving their original aspect ratio.

PPage will also import Encapsulated PostScript Format (EPSF) files. Like structured drawings, these can be scaled up and down with no loss of resolution. But they cannot be represented on-screen, so you are working blind, and they can only be output to a PostScript printer. If Gold Disk is working on *PPage* 3, these are two features that must be implemented – if only because *PPage*'s rival, *PageStream*, can both represent EPSF files on-screen, and dump them to a dot-matrix printer.

PPage's colour handling has always been good. Any of the 4,096 colours in the Amiga's palette can be created and used, all on the same page if you like, although what you see on the screen is a dithered approximation – orange, for example, is displayed as a pattern of red and yellow dots.

Printing primaries

Screen colours are defined in the normal Amiga manner as RGB values, but this isn't how they're printed. Talk RGB to a printer and he'll send you to the local TV shop; what he wants know about is YMCK – Yellow, Magenta, Cyan, blacK.

Because what you see on the screen is only an approximation of the actual colour, you'll need to choose the exact colour you want from a book of colour charts. This book will specify the exact percentages of yellow, magenta, cyan and black which, when mixed together, create each colour.

To get that exact colour you would type these percentages into the YMCK string gadgets next to the RGB sliders in *PPage*'s palette requester. When separating the document, the yellow, magenta, cyan and black components will be generated from these YMCK values. But this is still a surprisingly hit-and-miss process, depending on all sorts of things like the make and quality of ink used on the presses.

> **"On a 1Mb Amiga, with its 512k of chip RAM, there's no way you'll be able to work in hi-res colour mode."**

The Pantone Matching System was developed to standardise the printing of these kinds of mechanical or 'spot' colours, and now, new to *PPage* 2, is Pantone colour support.

This system consists of more than 700 numbered colours. Any printer who adheres to the Pantone standard can reproduce the colour you ask for exactly since he will use the specified Pantone colour formula.

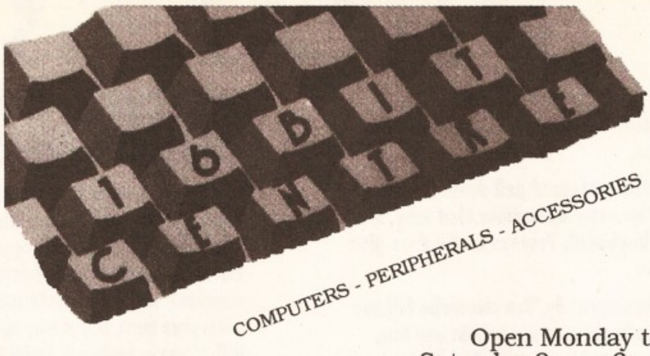
Pantone colours are selected from a list of names and numbers. On-screen they are, again, represented by a colour patch that only approximates the colour, so you'll need a Pantone colour patch book if you need to select exact colours. (Make sure you get one that is printed on very similar paper to that which your document will be reproduced on to – colours will appear as slightly different shades on different qualities of paper.)

Documents can be output in two different ways. First there's dot-matrix, which includes inkjets and lasers. *PPage* uses whichever printer driver you have specified in Preferences and gives you the choice of up to seven different densities.

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Presenting PROTEXT 5.0

Five years to the month after Protext version 1 was launched Arnor are pleased to present version 5, an enormous leap forward in both ease of use and performance.

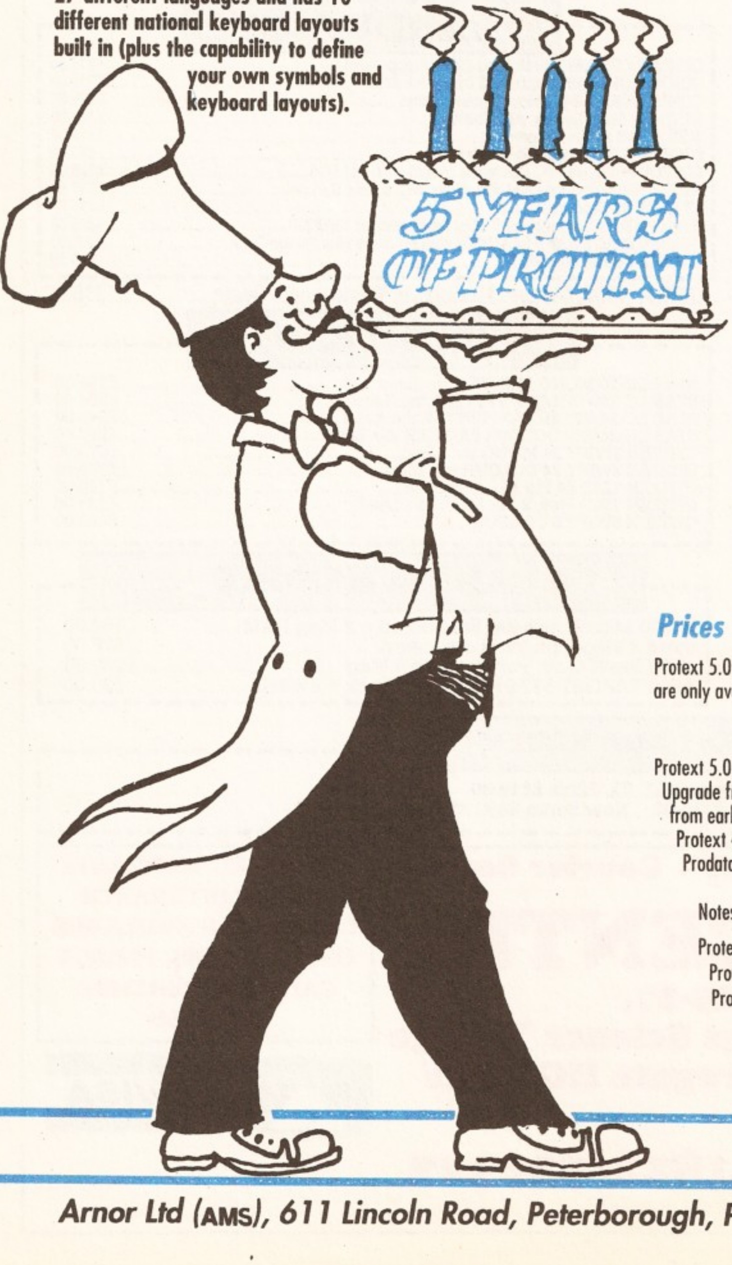
Protext 5.0 introduces a completely integrated system of pull down menus and dialogue boxes. The menus are among the many operations that may now be carried out with either the mouse or the keyboard. Protext really does give you the best of both worlds.

Protext 5.0 handles printer fonts flexibly and accurately. You can make full use of any number of proportional printer fonts, mix them freely within any line, centre them in headers, use automatically formatted footnotes. And Protext correctly formats your text as you type it, no matter how many font changes you use, showing you line and page breaks exactly as they will be printed.

Protext 5.0 is still the fastest word processor around. Even though we have made all these major improvements we have taken great care to ensure that text editing is as fast as ever. The menus work smoothly and quickly even with high resolution displays. But of course, you can use Protext's efficient set of commands and keys just as before and 5.0 remains compatible with all earlier versions from 1.0 onwards.

Protext 5.0 is a worthy successor to version 4, which was described as "the best word processor at any price", "the best text processor on the Amiga" and "the most powerful word processor on the Atari ST" (AUI, ST/Amiga Format, ST User).

Protext 5.0 heralds a new era of multi-lingual European software, in time for 1992 and the opening up of Eastern Europe. Protext may be used in at least 27 different languages and has 10 different national keyboard layouts built in (plus the capability to define your own symbols and keyboard layouts).



The Features



- **New fast & easy to use pull down menu system** with dialogue boxes and alerts; file selector; mouse dragging to set blocks. Menus complement existing commands and keyboard shortcuts, do not replace them. Menus may be used with mouse or keyboard. Amiga version follows Intuition guidelines.
- **Enhanced printing capabilities** supports multiple proportional fonts; mixing of different font sizes on the same line; proportional formatting whilst editing; side margin, headers and footers independent of main text font. Tabs, decimal tabs and centre tabs. Extensive range of printer drivers supplied.
- **Multiple file editing** - up to 36 files may be open; split screen editing.
- **Graphics mode support** on PC allows use in virtually any text or graphics mode including 132 column or 75 line VGA modes; user defined characters and on-screen bold, italics and underlining now on all versions; use of 13 different accents on any character.
- **Language support includes** Albanian, Basque, Czech, Danish, Dutch, English, Esperanto, Estonian, Flemish, Finnish, French, German, Hungarian, Irish, Italian, Latin, Lithuanian, Norwegian, Polish, Portuguese, Rumanian, Serbocroatian, Slovak, Spanish, Slovene, Swedish, Welsh. (Note: some printers do not support all languages).
- **Index and contents** generation. Indexer takes marked words or phrases; contents entries automatically taken from titles wrapped in control codes; many options for style of contents output.
- **Spelling checker** features completely new 110,000+ word Collins dictionary with very fast phonetic lookup. Anagrams and find word pattern. Foreign language dictionaries (German, Swedish available now, others to follow).
- **Many other enhancements** including multi-line footnotes and endnotes; automatic timed save; add column or row of figures; indent tabs; find word at cursor; 40 column mode support; sentence operations; inter- paragraph space; much improved expression evaluator; self incrementing variables; Roman numerals; newspaper-style column printing; file sorting utility with special options for names and addresses; revised manual plus new tutorial guide.
- **And don't forget Protext still includes** background printing; box manipulation; macro recording; exec files; headers and footers; find and replace; mail merging; undelete; file conversion utility; configuration program; auto reformatting; on screen help; time and date; typewriter mode; line drawing; disc utilities.

Prices

Protext 5.0 may be purchased from any good computer shop or directly from Arnor. Upgrades from earlier versions are only available from Arnor and the original discs should be returned with your order.

	PC	Amiga	ST/TT	Archimedes
Protext 5.0	£149.95	£149.95	£149.95	£149.95
Upgrade from v4.2	£60	£60	£60	N/A
from earlier versions	£75	£75	£75	N/A
Protext 4.2	£99.95	£99.95	£99.95	N/A
Prodata 1.1	£79.95	£79.95	£79.95	due 1991 Q1

Notes:

Protext 5.0 requires at least 640K of memory on all machines
Protext 4.2 requires at least 512K of memory on all machines
Prodata requires 1MB of memory on the Amiga

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CHECKOUT

Ease of use...........14/15
Like programmers, desktop publishers tend to lose manuals under piles of paperwork, so it should be obvious from the start which button to press in order to operate even the least-used features of a DTP program. In this respect, *PPage* is near perfect. For the advanced user there are hundreds of hotkey short-cuts.

Speed 10/10
Artists do their best work in fleeting moments of inspiration. If the software can't keep pace with the brain, creativity is going to suffer. In black-and-white med-res non-WYSIWYG mode *PPage* is quick enough to keep frustration at bay; for full colour hi-res WYSIWYG, at least 1Mb of chip ram and a 68030/68882 accelerator is recommended.

Output 10/10
Thanks to the Compugraphic fonts, dot-matrix output is restricted only by the resolution of your printer (or printer driver). The program desperately needs a PostScript interpreter so that a page which includes imported PostScript files can be output to dot-matrix printers. PostScript output facilities are excellent.

Graphics handling..6/10
All IFF ILBM formats are supported, including 24-bit pictures, plus *Aegis Draw* and *PDraw* structured drawings. EPSF graphics can be imported and manipulated, but not displayed.

Text editing.............4/5
Most editing will be done with your word processor, but facilities provided by *PPage* and its integrated Article Editor give good reason to change.

Colour..................10/10
Full Amiga 4,096 RGB palette, 100 million YMCB palette, plus more than 700 standard Pantone colours built-in.

Tools.......................5/10
Lacks power in certain advanced areas — no automatic facility for flowing text around an irregular-shaped graphic, only eight fill patterns available (none user-definable), no macros, graphics can't be slanted or twisted.

Documentation.......8/10
A comprehensive cross-referenced index helps find things quickly in a well-written and expertly laid-out 250-page manual. A quick reference card and tutorial video are also supplied.

Price value...........14/20
Expensive at £250 and a big increase from the v1.3 RRP, but quality costs. The price includes tutorial video.

Overall 81/100
PPage helps you to forget about working the software and helps you concentrate on laying out the document. If only this much thought went into the design of all Amiga programs.

You can choose which page to start printing from and which page to print to, and how many copies you want. There are buttons for black-and-white, grey scale and colour, plus a further three buttons to select which dither pattern to use – Ordered, Halftone or Floyd-Steinberg.

For quicker printouts you can select the Draft button and *PPage* will only output the text of a document, X-ing out all the boxes which contain graphics, so you can check the general layout and typography before printing the final document.

PPage will also allow you to adjust the scale of the dot-matrix output, so you can easily reduce A4 pages to A5 (25 per cent scale, not 50 – think about it), or, if you have a wide carriage printer, enlarge the whole page. This feature is most useful for getting quick dumps of pages with graphics in place – even at 50 per cent scale (A6 size output) most 6pt CG fonts are clear enough to be able to proof read the pages, which print out in a fraction of the time and use a fraction of the ribbon/ink/toner a full scale page does. You can halt or pause the printing process at any stage by simply clicking on a button.

> *"Outputting to a dot-matrix printer is an absolute piece of cake compared to the traumas of Postscript output"*

Outputting to a dot-matrix printer is an absolute piece of cake compared to the traumas of PostScript output, and the *PPage* manual quite rightly goes into great detail in this area.

PostScript printout

If you have access to a PostScript output device – maybe you have one at work or perhaps there's a cheap DTP bureau down the road – then you can take advantage of such advanced features as screen density, dot angle, colour processing and separation, cropping marks and page rotation. PostScript files can be saved to disk rather than printed directly, although complicated pages with lots of structured drawings or large fonts on them can result in huge files that won't fit on to a floppy disk. So you'll need a hard drive and a standard archiving utility like *ARC* or *ZOO* with which to compress the file down to floppy size. At this point you can trot down to the DTP bureau where they can decompress the file and output it for you. If the bureau doesn't own an Amiga, you'll need to write the file to a PC formatted disk (which Macs can read as well as PCs), so you'll need a utility like *Dos-2-Dos* or *CrossDos* for this job.

CG fonts facility

One of the problems with *PPage* 1.3 was that unless you had a B2000 with a PC Bridgeboard, you couldn't download fonts to your PostScript printer. But with v2 comes the facility to download CG fonts. Gold Disk makes the point that if you would like Adobe PostScript fonts to be made available in Amiga format, you should hassle Adobe Systems.

I have successfully used *PPage* and its Print to PostScript option to save a business card design to an EPSF file and get it output to a Linotron typesetting machine at a DTP bureau. The card included a couple of structured drawings and three different typefaces – Times Italic, Triumvirate and Triumvirate Bold. I gave the bureau a PC formatted disk containing a single EPSF file. A week later they handed me my 2,000 business cards.

PPage needs at least 1Mb of RAM or it won't load. But the story doesn't stop there. On a 1Mb Amiga 500, with its 512k of chip RAM, there's no way you'll be able to work in hi-res (interlace) colour mode – well, not for very long at least. *PPage* will soon warn you that memory is running low and you should save your document. You would do well to take heed of its advice without delay.

PPage is extremely hungry for chip RAM. The CG fonts are also memory munchers. To conserve RAM, and to speed up both screen and printer output, *PPage* creates font caches on disk. If you are using *PPage* regularly, these caches can very quickly become huge, which means on a floppy-based system you will be forever swapping disks so that *PPage* can access the cache. Loading caches from floppy has the nasty side-effect of negating the reason font caches were invented – it's almost as quick to let *PPage* calculate the font as it is to load it from the cache, although this uses up more memory.

My CG font cache – and remember, I use *PPage* to produce a monthly magazine – is currently about 5Mb, built up over a period of only two months. The higher the output resolution, the larger the font cache is going to be. I output to a Canon BJ-130 bubble jet at 360x360 dpi; my Times cache for this resolution is more than 1Mb, plus there are caches for 75x37 dpi (med-res screen), 75x75 dpi (hi-res screen) and 180x180 dpi (proof printouts).

PAL VIDEO VACUUM

At the time of writing no UK (PAL) videos were available, so the program is being supplied either without it or with the NTSC one. When the UK video is ready Gold Disk will supply it free upon application.

Hard and serious

It's fair to say that a hard drive is a necessity for anything but casual use of *PPage*. Having 1Mb of chip ram is more important than having another 2Mb of fast RAM, although I would recommend both of those, plus the hard drive, as your minimum requirement for serious use.
I know there are lots of you using v1.3 quite happily on your dual-floppy 1Mb Amiga 500s, and you'll be able to do the same with v2. Which proves you don't have to spend a fortune to start out on the great DTP adventure. AS

READER REVIEWS

We've told you what we think of *PPage*. Now it's your chance to tell us what you think about your own new soft or hardware. If you get something that is so new we've simply not had a chance to review it, then give us 50-100 words on what you think of it and why. If we use it you will get £5 for your trouble. Send your contributions to: Reader Reviews, *Amiga Shopper*, 30 Monmouth Street, Bath BA1 2BW.

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Moving pictures

Gary Whiteley opens the shutters on a regular video column and explains how you can get your animations together with Simpatica

When I first began to put Amiga animations on to video there was no simple way of taking a sequence of graphic images from the Amiga and pasting them together seamlessly on to videotape. This was because there was no way of controlling the video deck from the Amiga and letting it do the hard part – namely the editing. So I used to have to take my sequence of images and edit them, one frame at a time, onto U-matic VCR's (Video Cassette Recorders) – a nerve-wracking process where every image is recorded sequentially onto tape.

But unfortunately it wasn't so simple to do, purely because U-matic decks didn't have the frame-accurate editing required to ensure a clean cut between successive video frames. So I used to have to edit four frames of the image on to tape, then backspace two frames, add four more frames of the next image,etc.

Since there are 25 video frames to the second in PAL, smooth video animation requires at least 12.5 separate images for every second of video tape if you are 'shooting by twos', or 25 images per second if you are 'shooting by ones'. For instance, a constantly changing 10-second animation would require at least 12.5 x 10 images (125 frames). So this would be the number of edits required, which would take several hours of intense concentration. And if you made a mistake it was impossible to make an invisible cut back into the sequence.

Just imagine the heartache when you render all your 3D images on to disk (a task in itself) and are just about finished putting them on to tape, as usual against a ridiculous deadline, when oops, you drop a frame and have to start again.

Artbeat's *Simpatica* offers a friendly single-frame rendering system for the Amiga which looks set to do away with these problems.

Simpatica is a hardware and software system designed for professional video users to perform the complete assembly of sequences of Amiga images (IFF files and ANIMs, in almost any resolution and size) on to videotape. It will do this job completely unattended, leaving you free to get on with the rest of your life. It was devised by Stan Hearle and Pete Roe of Artbeat so that they could get on with theirs.

Requirements

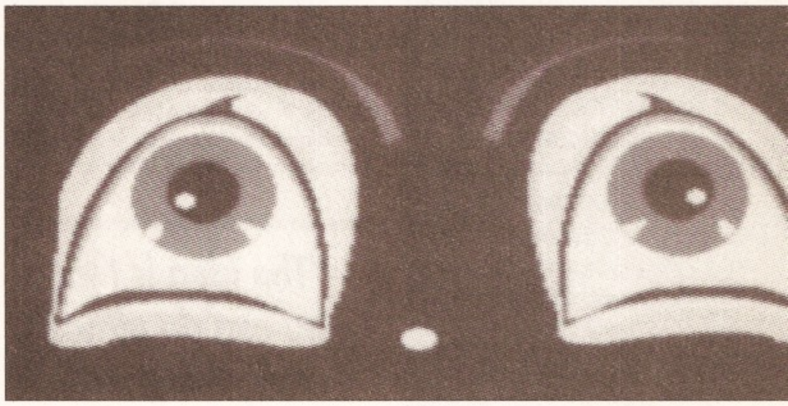
An Amiga computer (A500, A1500, A2000, A3000) preferably fitted with 1Mb of chip RAM (Fat Agnus). Access to a professional video deck (preferably with time code) supporting 9-pin Sony protocol, and a video monitor. You can hire these.

An RGB to video converter compatible with the input of the VCR. In many cases a Genlock will suffice. 3Mb of expansion memory is preferred, say Artbeat, as is a hard disk. It will work without these but you will be limited in screen resolution and floppy disk access. *Simpatica* supports Workbench 2 and it is multitasking.

The Hardware

The hardware is the electronic guts of the system, allowing the Amiga to control all the functions of any VCR carrying the Sony 9-pin protocol – including BVU (Broadcast Video U-matic) and Betacam, although I'm told that other VCR drivers are being developed which will control S-VHS, Sony series V, M2, D2 and possibly optical disk. *Simpatica* does not support domestic-type video decks as these do not have the accuracy for frame-accurate editing.

Connection is simple – a serial connector to the Amiga (A500, A1500, A2000 and A3000 supported) and a cable to the video deck. The video signal is taken from the RGB port of the Amiga and has then to be converted to your required format – usually composite video. You could use a Genlock or RGB converter for this but if you require a component output you will have to use a proprietary coder.



The eyes have it. *Simpatica* offers a professional way to automatically transfer your animations to video tape, so you can just watch and go.

There are two copies of the master disk, in case one should fail, and it can be installed on hard disk. Once your deck is connected and loaded up, you're almost ready.

The software itself, custom written by long-time Amiga developers, Lee Gibson and Kevin Stevens of Digigraphic, is pretty comprehensive and simple to use. A small amount of technical knowledge may help you initially, but on-screen help is always available, should you get stuck.

Mouse control

The idea is that you can do almost everything with the mouse – from controlling the video deck to selecting and editing your sequence of images. So if you're new to computing, the machines should not get in your way. The GUI (graphical user interface) is mostly easily understandable, although one or two of the icons are initially a little difficult to recognise.

There is a host of useful functions

JARGON BUSTING

ANIM: A method of storing animation frames, developed by Spartafilm, whereby only the changes between successive frames are stored, thus saving significant amounts of space.

CHIP RAM: This is the area of the Amiga's memory directly accessible by the custom graphics and sound chips. Originally a maximum of 512k, newer machines fitted with the fatter Agnus graphics chip can access 1Mb, allowing smoother animations and more screens to be displayed at once. The new Amiga 3000 comes with an Agnus chip capable of addressing 2Mb of chip ram.

CONTROL TRACK: A track onto which regular pulses are recorded so that the position of the video tape can be read by the VCR as time elapsed. Unlike time code, index points must be set so as to locate other points on tape.

FAST RAM: Any extra memory which is not chip ram. The custom chips cannot access it, and because such accesses to chip ram can block out the central processor and slow down its own accesses, fast ram is faster.

GENLOCK: A way of slaving one video source (eg Amiga) to another (eg video tape) in order to synchronise their signals to allow stable wipes, mixes and other effects including overlay between the two sources.

SONY 9-PIN PROTOCOL: This is a data configuration used by compatible VCRs which allows them to be controlled from an external source.

TIME CODE: A numerical coding system recorded onto audio or video tape to uniquely identify hours, minutes, seconds and frames, etc. to allow accurate location of the tape at any point.

24 BIT GRAPHICS: Normally, the Amiga uses between one and five bits (binary digits) to store the colour of each pixel (picture element) of a display. This means that between two and 32 colours can be displayed. Hardware add-ons are now becoming available which use 24 bits per pixel, giving a possible 16.7 million colours.

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continued from page 45

BEGINNERS START HERE

The Amiga 1000 was the first home computer that could offer video, graphics, sound and DTP at an affordable price. It also looked like it was going to have a reasonable lifespan and would be well supported.

It's been a long time since the 1000's launch, but it is still going strong and is used widely for video productions – to produce graphics, animation and titles – for broadcast TV and films. It has helped produce music, sound samples, DTP work, digitised images and, it must be said, its share of frustration and elation.

The early days were difficult. The software was American, so the resulting video output was in NTSC (the American National Television Systems Convention) and had around 100 lines missing from the bottom of the standard UK PAL (Phase Alternate Line) screen. The video output from the machine wasn't the best in the world, and the lack of interfacing devices for rendering graphics sequences to tape was hardly inspiring. But with perseverance and experimentation the Amiga has evolved into a useful beast.

We now have a multitude of fine video applications – software ranging from 2D and 3D graphics and animation programs to video titlers and scrollers; hardware supporting 24 bit graphics; video manipulation; video editing; and special effects. And we have far more capable Amigas, thanks mainly to the Enhanced Chip Set.

With all the above in mind, I'll be attempting to bring you the lowdown on the best in Amiga video, from the wackiest to the incredibly useful to the credibly useful.

in this versatile package. The heart of the system is the Image Edit Window, which is where the bulk of editing your picture sequences is carried out. It looks like a four-frame clip of film and each frame displays a mini version of the full-sized picture that it represents. But you're not limited to four frames – the 'film-strip' is as long as your sequence of images. And loading them is as simple as double-clicking on a frame and using the pop-up directory to select your files.

You can also use the Image Edit Window to cut, paste, delete and insert frames (and ranges of frames) into the sequence. But not into the middle of a loaded ANIM file. They remain unaltered as they're only held in memory for the use of the editor

> **"The idea is that you can do almost everything with the mouse."**

and will not be re-saved to disk. The mouse is used to move backwards and forwards along the film strip so you can view and alter any of the files in the sequence.

Read the script

As the sequence is built up in the editor, a script is being compiled elsewhere which can be kept for your own reference.

At any time while preparing the sequence in the editor, you can have a real-time 'Mini Preview' which will show you a scaled-down version of the animation directly on the Amiga screen. This allows you to edit the sequence offline first and leave your expensive video deck free for other tasks, as long as the hardware remains connected to your Amiga.

Simpatica will recognise whether your video deck has a time-code module fitted, and will use it if it does. But it works fine using the control track of a 'pre-blacked' tape instead. However, if control track reading is being used, it is advisable to complete your work in one session as the location points will be lost when the tape is ejected. This is not the case in time-code operations as the code can be read and the correct tape point located in order to continue a project.

Once you've set up an image sequence and 'blacked' your tape – which you can do using Simpatica if you have no other handy source of black – then the rendering process can be got on with.

No Sir, render

To start rendering, all you have to do is tell the VCR where to start recording on the tape and tell it the duration of each picture to be recorded (in video frames – where there are 25 frames to every second in the UK PAL TV system). This can be done very simply using requesters. You can also change the pre-roll time of your VCR (pre-roll is the time allowed for the run-up to the edit point so that the VCR can get up to speed and stabilise). This may save a little time in the long run if you have a very stable deck. You can also ensure that your images are centred on the video monitor in case your Preferences are set wrong for your Amiga screen. The rendering can then be left to take place unattended. When it has finished, an optional time-out can eject the tape and shut the deck down.

So, you've rendered your sequence, but there are a couple of small problems. First, there's a black frame where a picture should be. Well, this is usually easy to cure, especially if you have time code, since all you have to do is tell *Simpatica* to simply re-record the missing frame over the offending gap once you've found its start and finish points. But you'll have to do a little detective work first. Second, there's a short sequence of black frames with a file name written over them. This is an optional way of having *Simpatica* tell you that a file was missing and that it waited for a pre-determined time for you to change the disk, but since you were asleep anyway it just carried on with the rest of the job.

Other stuff

As well as all the above, there are some useful test patterns to make sure your video monitor is set up OK, a 40-second clock that you can customise with your own logo and full remote control of the VCR using the mouse to rewind and search. You can also set tags, these being points on the tape that you have decided you want to locate quickly and easily by recalling previously stored values.

Coming soon will be support for 24-bit graphic boards such as G2 Systems' *Masterpiece* and the Amiga Centre Scotland's *Harlequin*. So then we can really start cooking.

And of course you can use the *Simpatica* to take control for more traditional animation jobs such as rostrum camera work and time-lapse. And I'm sure there's more than that. I'll leave it up to you. AS

CHECKOUT

Documentation 7/10
Workmanlike, but could have been a little clearer in some areas. An overview of some of the relevant technical terms used in video may also be of benefit to some readers. And some of the Icon graphics are rather hard to distinguish.

Construction 8/10
Solidly built, sturdy case. And no moving parts to wear out.

Flexibility 9/10
Simpatica doesn't tie up your VCR if you don't want it to. It accepts most Amiga graphics modes and resolutions, and can be used to perform other types of video-based animation.

Speed 14/15
About 180 frames an hour with BVU, 240 with Betacam. This compares to my average manual entry speed of about 30-40 on to Lo-Band U-matic.

Features 13/15
comprehensive features for all aspects of single frame rendering, with 24- bit coming soon.

Ease Of Use 14/15
The graphical user interface and layout are good, although one or two of the icons are initially confusing. On-screen help is very good and easily available. Most people should be able to get into this package very quickly.

Price Value 20/25
OK, the price tag is high, but it's not that much in terms of professional video kit, especially when compared to other, less versatile controllers. It would seem like quite a bargain if you added up all the long-term costs of paying an editor, equipment hire and so on if you were a regular user of animation storage systems, especially if you already have an Amiga as your graphics engine.

Overall 85/100
Simpatica is not for the casual domestic video user, but if you are a serious Amiga videophile, or are looking at installing a video graphics and rendering system into your edit suite, you would do well to take a close look at this system before making that expensive decision.

SHOPPING LIST

***Simpatica*............£1750 + VAT**

Available from:
Artbeat Computer Graphics Ltd
2 Wickham Place,
Basildon,
Essex,
SS16 5UN.
☎ 0268 289384

Motor mouse

Jeff Walker reports test results from the mouse track and offers a few pointers on rodent handling

When you take a new car for a test drive you need a while to get used to the feel of the steering, gears, clutch and brakes. Similarly, a new mouse feels alien for the first few miles. How quickly you adapt can often influence your decision on which mouse to buy.

If you have to use more than one work station, swapping between the different mice on the different machines is an occupational hazard. Like cars, we feel most comfortable driving the one we use most.

More and more professional people these days are taking to carrying around their own mice, those that with a quick change of adaptor can be used at all the different work stations. The Naksha mouse, which is designed for use on the Amiga, Atari ST and Amstrad PC, has enjoyed a monopoly in this area of the Amiga marketplace for some time.

But recently Contriver has entered the fray with a versatile mouse that has a couple more strings to its bow. However, If your bag is to dump the clutch and go screaming off from the lights, you might like to cast an eye over Pandaal's latest souped-up rodent.

CONTRIVER 5 IN 1 MOUSE

As well as the Amiga, ST and Amstrad PC, the Contriver 5 in 1 mouse can be used with the Commodore PC-III series (installation software is supplied) plus the Schnieder Euro PC and AT286.

In the box with the mouse is a T-shirt (of all things) a thin sponge mouse pad with the words 'Mouse-Pad' cunningly printed in the corner to ensure that it is clear to the purchaser which item is which (personally, I'd rather wear the mouse pad) and a mouse house for sticking to your monitor or whatever. Freebies like this are designed to increase the perceived value and have very little effect on reviewers.

Sizing it up

The 5 in 1 is smaller all round than the original Amiga mouse – a fairly compact 95mm x 64mm and 25mm tall at its highest point – weighing in 20g lighter at 100g.

It has more than 1.5m of lead attached; almost 2m if you count the length of the adaptor as well. The adaptor itself is a particularly solid affair – top quality connectors with screws at the Amiga end so it can be securely attached to the computer in the same way as a video, a parallel or a serial lead can.

Because it is not as heavy, and because its lead is more supple, the 5 in 1 is easier to push around than the original Amiga mouse. Under the buttons are microswitches, as opposed to bubble or leaf switches in the Amiga mouse, which mean a more satisfying, more positive, click is heard and felt and, more importantly, it means the switches will last a lot longer. A typical high-quality microswitch is designed to live for approximately one million clicks – that's a mind-boggling 270 clicks a day for 10 years.

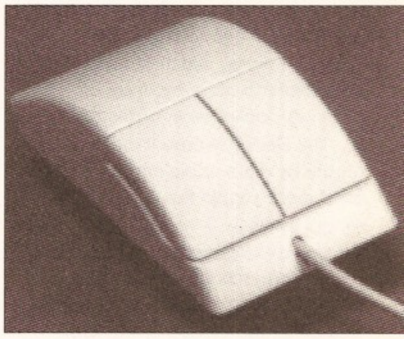
The mouse mechanism has a resolution of 220 dots per inch (dpi), which means that under normal operation a shift of just under three inches will move the mouse pointer from one side of the screen to the other. Like all other mice when used with the Amiga, this resolution can be reduced via Preferences or increased by various levels with shareware programs like *MouseZoom* and *DMouse*.

New resolutions

I mention this multiple mouse dpi resolution aspect of the Amiga because Contriver makes a multiple dpi mouse for the PC as well. In order to adjust its resolution, the PC mouse has a little slider switch on its left-hand side, exactly in the place your thumb tends to hover. The 5 in 1 uses the same outer shell as this multiple dpi mouse, and sticking out of the hole where the dpi slider switch would normally be is an obtrusive little lump.

I found this lump an awful distraction. Every time I grabbed the mouse my brain had to tell my thumb that the lump it could feel was not important. In trying to forget it, I only managed to notice it more.

In time, however, I would guess that it would become an accustomed lump. In fact, after a while, if you picked up another, lumpless mouse, you might even feel terribly lost without it. No doubt a phenomenon similar to that comforting rattle emanating from somewhere under the dash-board in the car.



Clean lines and a low profile lend that Lotus Elan look to the 5 in 1

Checkout on page 48

PANDAAL DAATA MOUSE

When manufacturers talk about the 'speed' of a mouse, they are really talking about its dots-per-inch (dpi) resolution – the dots in question being the pixels present on the computer's monitor.

If a mouse has a resolution of 640 dpi, then a horizontal mouse movement of one inch would cause the mouse pointer to travel from one side of the Amiga's screen to the other, because the maximum width of a normal Amiga screen on a normal Amiga monitor is 640 pixels. The original Amiga mouse has a resolution of around 180 dpi – it takes about a 3.5in push to move the pointer across the screen.

Tidy desktop

The new Pandaal DAATAmouse is 360 dpi, which means the area of desktop required to operate the mouse, taking account of the size of the mouse itself, is a very tichy 4in x 6in. But, on the Amiga the resolution of the mouse can easily be increased (or decreased) with software. Using the default settings of Matt Dillon's shareware *DMouse* program, for example, a mere half-an-inch shove on the DAATAmouse is all that is needed to whiz from depth gadget to close gadget, bringing the area of desktop needed in which to operate the mouse down to a stingy 3in x 4.5in. Now that's fast.

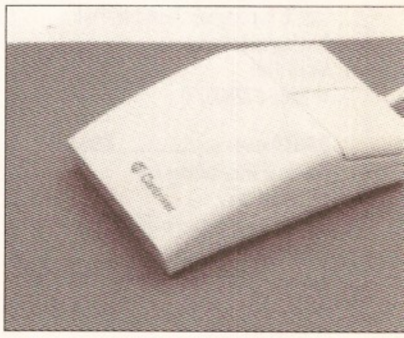
In physical size the DAATAmouse is about the same bulk as the original Amiga mouse – the same length and height, but fractionally narrower. However, it weighs considerably less; 80g instead of the original's 120g. So one of the first things to strike you about this new Pandaal mouse is how light it feels.

Travelling light

Its weight, or rather its lack of weight, is entirely due to the extra-lightweight ball inside it.

Mouse balls are usually heavy in order to keep up a good pressure on the mouse pad. All this rubbing the mouse to and fro causes static to build up – a tiny, tiny amount, but enough to reduce the friction between the ball and the mat and possibly cause the mouse to 'slip' if you move it a little too quickly. So, in theory, the lighter the ball, the more chance there is that the mouse will sometimes slip; a very annoying thing when it happens.

Pandaal has addressed this slippery problem by coating the DAATAmouse's ball with an anti-



Stick wheels on the DAATAmouse and watch it clean up at Le Mans.

continued on page 48

continued from page 47

static material, which means that the ball, and therefore the whole of the mouse, is much less heavy.
It works well. Using it on both soft sponge and hard vinyl mouse pads, the mouse feels like it is almost hovering on air. Pandaal claims their mouse's operation feels silky smooth, a description which I would be hard-pressed to dispute.

Robust buttons

The buttons, as one would expect of a mouse of this price and quality, are microswitched, so there is little danger of them wearing out quickly. The upper face of the mouse is a hand-hugging arch shape and the large (1in x 1.5in) buttons fit seamlessly into this design. A featherlight touch is all that is needed to effect a click; there is not even the merest hint of unpleasant sponginess about the operation – straight down and up, no messing.

Sponginess, by the way, is that quality of a mouse which describes how much pressure is required to keep a button down once depressed – or, for you engineers out there, how much upward pressure the mouse button is exerting on your finger. The less spongy the mouse, the less effort is required when clicking and dragging items, which would be a sought-after feature by users of graphics packages in particular.

The DAATAmouse's tail is as supple as 4mm cable can be – which is far more supple than the original Amiga mouse's 5mm thick tail – and it measures a generous 1.7m long.

Underneath the mouse there is a small switch that allows it to be used with either the Amiga or the Atari ST; no cumbersome adaptor is required for it, as is usually needed with a great many other dual-purpose or multi-purpose mice. AS

SHOPPING LIST

5 in 1 Mouse Upgrade....£29.99
Contriver (Europe) Ltd
Unit 3, Buckingham Industrial Park,
Buckingham, Bucks
MK18 1UH
☎ 0280 822803/4

DAATAmouse.................£39.99
Pandaal Marketing Ltd
44, Singer Way,
Woburn Road Industrial Estate
Kempston,
Bedford, Beds
MK42 7AF
☎ 0234 855666

CHECKOUT

CONTRIVER:

Ergonomics.. ....10/20
Not completely comfortable to use. If you have small hands the non-rounded back edge rubs the heel of your hand.

Style 3/5
Though the creamy-white colour makes the Amiga look dirty, this is compensated for by clean lines and low profile.

Accessories 10/15
The mouse pad is a cheap sponge affair, but adequate. The mouse house is useful if you have a cluttered desk.

Buttons 15/25
Microswitches mean longer life and a more positive click. Less pressure is needed than on the original Amiga mouse, but feel is still spongy.

Resolution 4/10
At 220 dpi it has lower resolution than some (280dpi). It can be improved with shareware like *MouseZoom* or *DMouse*.

Price value 19/25
The same price or less than other Amiga micro-switched mice. Comes with more 'freebies' and can be used with more computers than any other mouse.

Overall 61/100
This mouse's multiplicity is its main buying point and is what raises it above similarly priced competitors.

CHECKOUT

PANDAAL:

Ergonomics 17/20
Very comfortable in the hand; not a sharp edge in sight. Its arched shape means your fingers rest on the buttons without danger of accidental clicking.

Style 5/5
It's sort of mid way between the two shades of the keyboard. From the side it looks like a racing car. High pose value.

Accessories 8/15
Comes with an adequate sponge mouse pad. No mouse house.

Buttons 22/25
Big wall-to-wall microswitched buttons. A light pressure is all that is needed to cause a click. Not a hint of sponginess.

Resolution 7/10
At 360 dpi, it has the highest resolution in its price range. (The nearest competitor is the Naksha at 280dpi)

Price value 21/25
For £40 I would have expected a mouse house as well as a mouse pad. But then I would have expected to pay more for a 360 dpi mouse. Great value.

Overall 80/100
A top rate, high-resolution, lightweight, microswitched mouse. Currently, this is the mouse all other mice in the same price range will be measured against.

BAS

The *Big Alternative Scroller*, new from Alternative Image

Report by Gary Whiteley

Here's an interesting new product for the Amiga video market. *BAS* is an easy to understand, multi-featured, video titling package which has no frills – just a simple set of options for making text scroll up or across your video, with almost instant access to all its functions and its 20 built-in typefaces, shadowing, spacing, speeds and colours.

In less than a minute after you've booted up with the BAS disk you are in action. A simple menu screen appears. If you have itchy fingers already and hit the F1 key (as almost all *BAS* options are accessed via function keys and exited using Esc) then a scrolling demo appears that explains *BAS* to you. Within half an hour I'd been through all the functions: changed typefaces and colours, typed in text, toyed with shadowing, saved to disk and not even bothered to read the short manual. In fact the package carries the following text – "WARNING, this software does not require a manual". And it's true. Even if you do get stuck there's always help at hand – just hit the Help key.

Features

- 20 built-in typefaces; although only one can be used at a time. But they've all been chosen because they look good on screen and have enough variety for many uses.

- Vertical and horizontal scrolling in nine speeds, either continually looping or as a single pass. And the options of stopping and starting at any time. The text can be scrolled over any portion of the screen – set using the scroll parameters.

- Colours: only four colours are currently available (including background and shadow colours) but this won't be a major drawback to most users as most titling work is very simply coloured.

- Text Editing: simply type in your text, with either left, right or centre justification. Reformatting is also very easily done.

- Shadows: these are positioned by using the cursor keys.

- Text Spacing: words and letters can be spaced out, again by using the cursor keys.

- Disk Save/Load: *BAS* uses its own disk format, but a large number of files can be saved onto one disk thanks to efficient storage techniques.

In addition, *BAS* graphics are in full overscan, high resolution interlace mode and the program will run on an Amiga with 1Mb of memory and only one disk drive. It is also optimised to run as fast as possible, so it will use your co-processor if you have one.

Drawbacks

BAS cannot import any other fonts, load or print ASCII files, or multitask. But I'm told that these problems will be rectified and additional features will be added when its successor, *BAS* 2 arrives as an upgrade. AS

SHOPPING LIST

***BAS*....................£50 (£1 p&p)**
from: **Alternative Image Productions**
6 Lothair Road
Aylestone
Leicester
LE2 7QB

CHECKOUT

Documentation 10/10
In fact you don't actually need any, as it's all on screen.

Features 5/15
Good at what it does, but fairly basic.

Speed 15/15
The slowest function was my own typing speed.

Ease of Use 19/20
Extremely easy to use.

Quality 14/15
I found *BAS* to be of very good quality, but where video is concerned, quality usually depends on the equipment as much as the software.

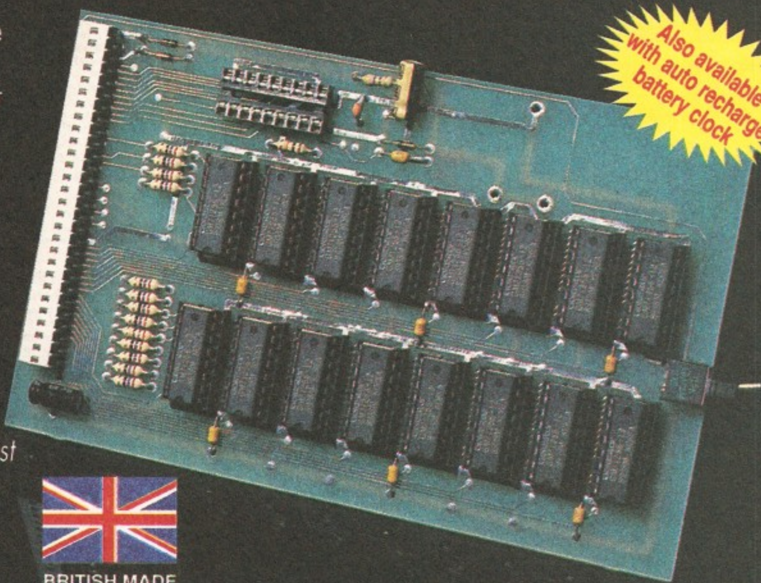
Price 24/25
Very much a value for money package.

Overall 87/100
If you're in the market for a dependable, understandable and highly useable, if not completely flexible, video titler, then I would consider *BAS* to be £50 well spent.

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World of Graphics



The normally sedentary Phil South gets animated with a graphic account of Disney's Animation Studio

The Amiga is a wonderful graphics computer, and over the endless meandering months I will be following it into the world of graphics. In each issue we'll be taking a look at all the latest in graphics software and hardware for the Amiga, plus any bits of hardware that push back the boundaries of what is possible. 2D, 3D, hard or soft; you name it. If it's graphics you'll find it here. And to kick us off with a bang (nobody mixes metaphors in quite the same way I do) we have Disney's *Animation Studio.*

The wonderful world

The box contains three disks and two enormous manuals. The 'get you started' book is only a fifth of its apparent thickness in real terms as it contains the English, French, German, Italian, and Spanish language versions all in the same volume. I flicked the main manual hopefully to see if this was also the case with that one, but unfortunately this is English all the way through. Drat. Still, such a thick manual must mean that the thing is well documented, right? Okay, yes it is.

"The thing that really got my goat was the copy protection using the original disk as a key disk. Aargh!"

The program doesn't really need quite such a thick book to explain its use, but on occasions it is handy to have something to refer to, not least when you come up against the Disney special storage formats. The program handles IFF and ANIM files, but also its own format (Why? Surely there are enough formats in the world?) called CFAST. But by and large if you've used an Amiga before then you can dive into the program straight away without much faffing about looking things up.

Moving along to the disks, these are the Studio, the Morgue and the Demo Reel. The main guts of the program is on the Studio disk, containing the two modules which comprise *Animation Studio*, namely the Pencil Test and Ink & Paint.

Pencil testing, for those of you uninitiated in the graceful art of animation, is usually the first stage in any production, where the basic animation is laid down using pencil sketches on translucent paper, called 'onion skin'. The paper is not actually made from onions, so why it is called this is more obscure. If you examine the skin of an onion (well, until you start crying anyway) you will see that the skin is made of many translucent layers of very thin material. So onion-skin paper is very thin, and when you draw on it and put another sheet over the top of it, you can see through to the sheet below.

Now this is very handy in animation as you can match subsequent drawings to the last three or four that you've done. This means your animation remains consistent between frames and, unlike so many computer based animation programs, using this technique in the real world has allowed animators to produce smooth, continuity-error-free cartoons since time immemorial. Or at least since humans have been compelled to sit in the dark together and watch cartoon animals knocking seven bells out of each other.

Know your onions

So Disney, having its roots in real paper and pencil based animation, has added this feature to its first animation program. The paper sheets are imitated by allowing the previous frame to show through, simply by leaving it on the screen and rendering it as a shade of grey. This is a splendid effect on screen, giving a very good impression of translucent layers, with all the lower layers becoming fainter and fainter until they finally vanish. This really is the only way to do smooth animation; by seeing where you're going and where you've been all on the same page. *DPaint III*, although an otherwise excellent program for animation (and something of an industry standard to boot) makes you flip from screen to screen to see what you are doing. The onion-skin effect is a much more flexible and artistic alternative, one that has been a long time coming to computers. Too long in my view. If people were using these techniques in real animation, why weren't they adopted right off?

BLITS & BOBS

One former Disney employee, Don Bluth, went on to design such famous classic computerised coin-op arcade games as Dragon's Lair and Space Ace. Nice one Don.

After you've tested your animation, and it looks like the whole of *Fantasia* crammed into 10 seconds, you need to colour it in. (You also need Leopold Stokowski to do the soundtrack for you, but we'll nip by that for a second.) The colouring in Disney's *Animation Studio* is done in the Ink & Paint module, which boots up automatically when you select Ink & Paint from the menu in Pencil Test.

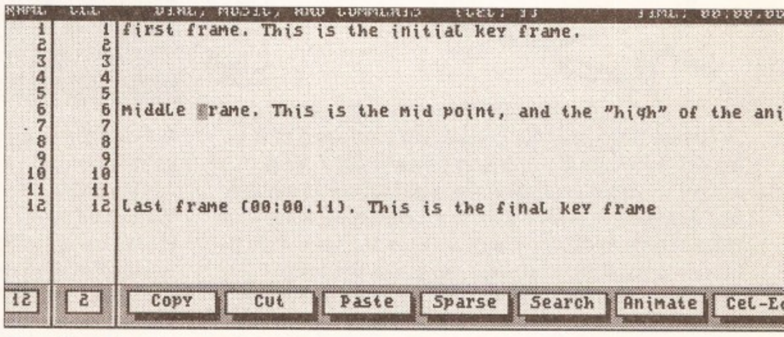
Animations can be drawn in any of the usual resolutions, and you choose the resolution in pencil test and the amount and range of colours in Ink & Paint.

If you squint, Ink & Paint looks oddly familiar, especially to people who remember the original *DeluxePaint*. In Ink & Paint, simply add colour to your animation in the same way you would use any normal paint/animation package. This really is *DeluxePaint* territory

Back to skool

It is a very educational piece of kit. The Disney samples supplied with the disks give you a unique interactive insight into how the pros do it. (Animate, that is.) The example disks are brimming with demos, and all of them are enchanting. You can examine all the Disney files on the disk, but you are very sternly warned before loading each one that it is for tutorial use and only and the characters are © Disney. You can learn a lot from the demo files even if

continued on page 52



To adjust the timing of various moves, the best way is to use the exposure sheet. By doubling up certain frames you can create a slowing down or speeding up of certain moves, making an otherwise dull animation appear much more dynamic and professional.



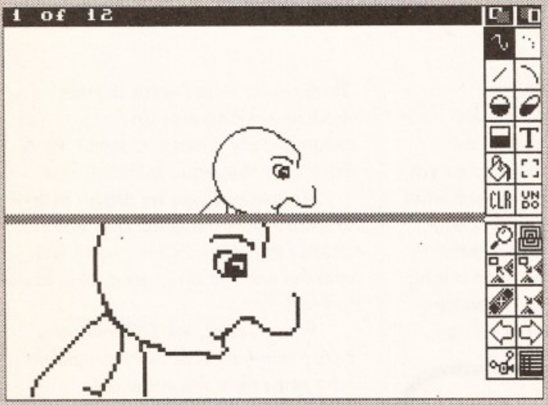
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SNOUTY GOES FOR A LOOPY WALK

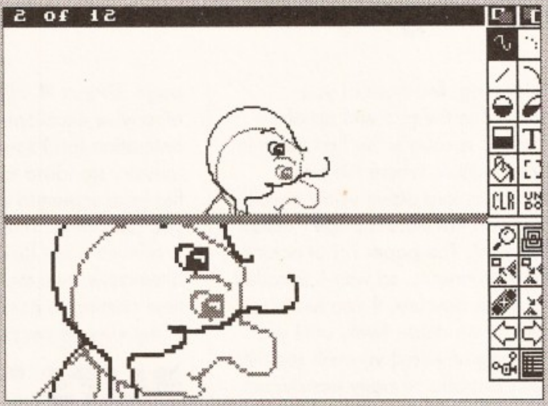
And now a quick tutorial on how to get the best out of Disney's *Animation Studio*. I took one of the walking loops from the library and added my own head – a character with a big floppy snout. So first some hints:

- **The onion skin prevents the need for flipping back and forth when positioning your character's features on the screen.**
- **Animation is all about timing.**
- **To help you get a start, why not try scanning in your key frames?**
- **To scale up and down in size, put construction lines on the cel and erase them when you're finished. Or better yet, why not draw them on another page and lay the character over that page while you redraw.**

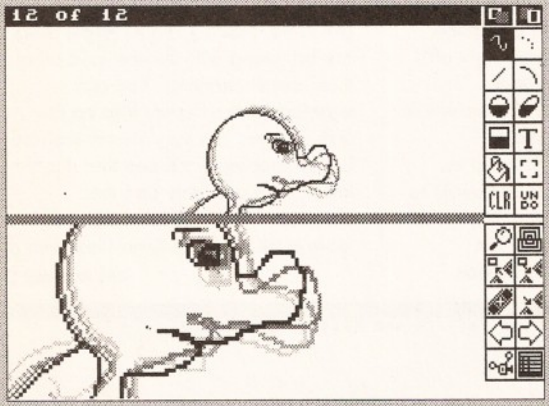
Let's try knocking up a quick animation and see how it works.



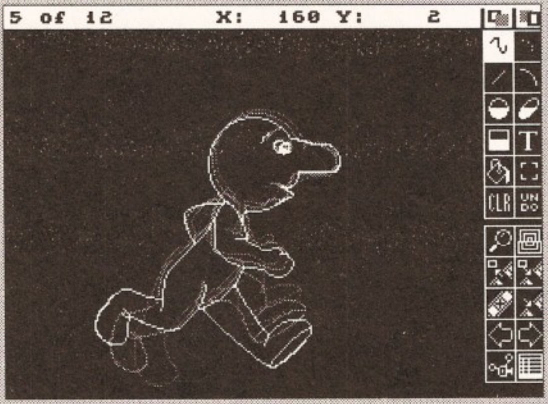
1 First the pencil test. You must draw your character very carefully as you will need to remember how to draw him again in a slightly different position. (I suppose that sounds quite obvious, but it's actually harder to do than it sounds.) I found the best way to sketch was in magnify mode – it shows the paper as it would be seen if your nose was about two inches away.



2 Using the previous cel as a guide, we can draw the figure again. What we are concerned with here is the characterisation of the figure and the timing of his movements. Fast movements happen in very few frames and softer, slower movements happen over a lot of frames. Here I'm making the end of the nose follow the character's head bobbing up and down, but making it follow on afterwards.



3 Notice here how the nose hasn't stopped at the end of its arc, but continued upwards. If it were longer it would probably slap against his forehead, but this isn't supposed to be an elephant. Note that this is the last frame. It's good idea to make sure it matches with the first frame to make the loop complete, or there'll be a jerking movement at the end of each loop. (Take care not to go beyond the last cel or *TAS* will add frames automatically, but they can be deleted with the cut tool.)



4 For a different effect, try inverting your normal animation and you'll be starting with a black background. This is nice for blackboard drawings that come alive, or even a *Fantasia* effect, where things come out of the blackness to cavort around on screen. And on the subject of *Fantasia*, unfortunately Disney forgot to support soundtracker scores or modules, so you will have to get a PD .SMUS0-to-tracker converter to add a few more interesting tunes to your cartoon creation.

you can't use them. The examples on the disk cover a wide range of basic and advanced animation techniques like in-betweening, anticipation, key frames or extremes, silhouette tests, arcs, path of action, squash and stretch, walking loops and flying.

Key frames are the extreme frames of an animation, usually the beginning and end frames, plus one in the dead centre of the action. The remaining frames are then 'tweened'. In-betweening, or 'tweening' as it is known in the trade, is the technique of filling in the gaps between your extreme frames.

Silhouette tests are an essential animation technique, meaning that if you blacked in your character, the key frames are still recognisable. The reason for this is simple; if the key frames are strong and it is easy to tell what's going on, even in silhouette, then your animation will be easy to watch. If the key frames aren't strong enough to stand up to the silhouette test, then your animation will probably be bunched up and rather difficult to follow.

Anticipation is another essential animation technique. You don't realise how much of this goes on, until you see an animation off the TV frame-by-frame on your video. Try this test: video a Tom and Jerry or Disney cartoon from the telly. Now watch it frame-by-frame and notice that a lot of the actions are anticipated – an exaggerated movement in the opposite direction to the final movement. But the anticipation is so fast that you don't see it. It does make the moves stronger and once again this is necessary to make your animations stronger and easier to follow. In the same line as anticipation you have squash and stretch. The point of this is essential to good animation, and the effect is so fast on screen that you hardly ever see it clearly. Like a rubber ball bouncing on the floor. The ball stretches out towards where it will bounce, squashes when it hits the floor and rebounds in the stretched position. Try the frame by frame video test and see.

BLITS

Disney's most notorious outing with computerised animation was with the hi-tech Tron starring Jeff Bridges. It cost millions to make and, guess what, it flopped.

& BOBS



Arcs occur when a figure's limbs describe an arc in space and the demos clearly illustrate this point too. A finger describes an arc in space, and the finger follows a smooth curve on the screen. It's a common mistake to let the finger cross the imaginary line, and this looks really naff. Path of action is similar to the arc in practise, except the whole body of the character describes an arc in space. This is a useful technique for giving depth to your animations, as the characters don't just stay in the one flat left to right plane. You can move around and show different camera angles if your characters can move along curves. In an example on the disks, Goofy slides down a ski jump from the top right hand corner and whizzes off the screen in the top left, having grown in size and curved across the screen.

> **"All the demos except one were silent, and the one that did have sound just went 'boing'."**

Nice Touches

The fact that you can use a different palette for each frame is practically unheard of in the world of Amiga. Obviously the restricted palette for each frame helps, but it is still very impressive as a feature. Also unavailable in other packages is any kind of dither fill, but you get this with Disney. This makes the most of the colours you have on each frame as you can mix them in a stippled effect and stretch the palette. This also allows very subtle shading effects, not usually possible with restricted palettes.

Also very good is the use of frisket, which *DPaint* users will know as stencil. This allows you to paint in an area without painting over certain colours. These are protected as if they were masked with masking tape. When you remove the frisket, the colours behave normally again. It allows some very professional effects and no drawing package is really usable without this kind of masking.

Another nice touch is the use of fills, and *Animation Studio* has more types than most. First there is the regular solid fill, which floods an area of the screen with colour. Then there is another fill that creates a checkerboard of two colours of your choice, which usually has the effect of creating a third colour. The third type of fill is the one controlled by the fill bucket with no paint coming out of it in the tool box. This is known as the Fill To Colour tool. What it does is at first a little bit odd. It fills a shape to the edge, even if that shape is overlapped with another. The example given in the capacious manual is of two circles intersecting. If you clicked the fill to colour tool in the centre of one of the circles, it will be filled to the edge, not stopping where the second circle intersects. It's a bit hard to explain, a sort of 'smart fill' best describes it, but I can't really see the benefits of such an unpredictable tool. Experimentation may provide you with some good uses for it. Unusual, sure, but very clever with it.

Love Bugs

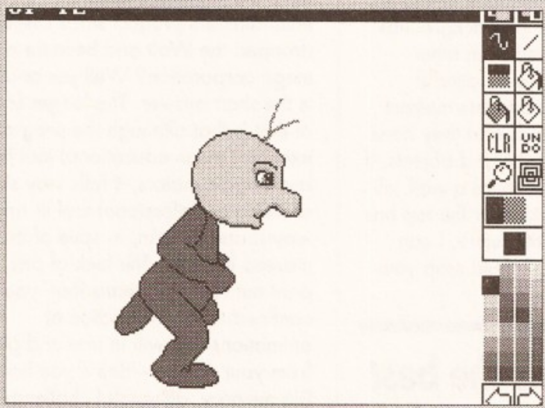
There had to be some drawbacks to compromising the aims of the package, and they are many. One of the biggest omissions is the lack of a printing facility. I would have said this would be first thing on the agenda. But obviously this is the first thing to go when you want to take up

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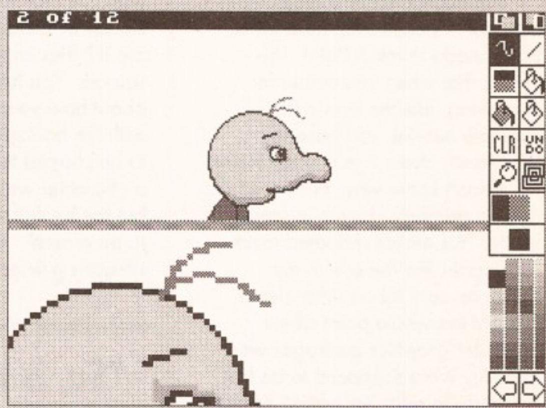
BLITS & BOBS

Walt Disney's first feature film, Snow White, *took a team of more than 1,000 employees three years to make at a cost of $1.5 million. Quite a lot in the 1930s.*

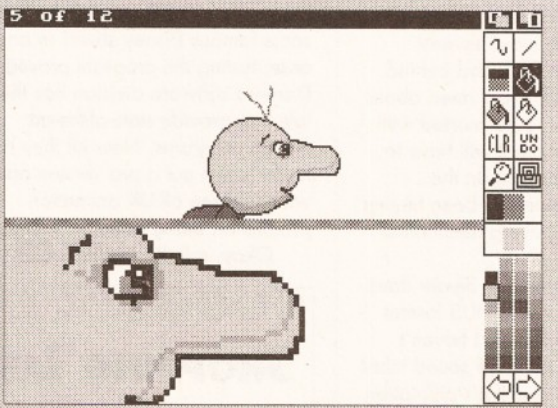
Adding colour with Ink and Paint



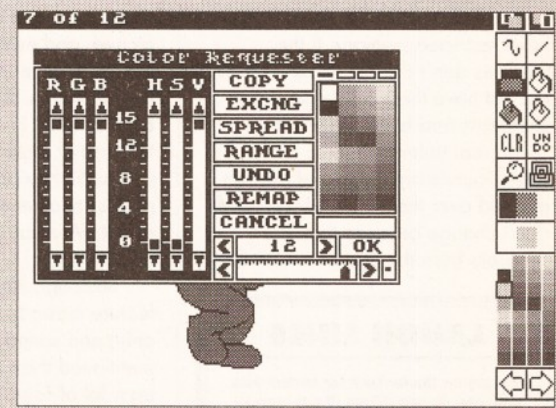
1 Moving on to Ink & Paint, we can colour in and clean up our basic animation. Filling in the flesh and clothes is a piece of cake as you just use the fill tool. And although this gives you a quick result, you might consider adding more shaping to the different areas using a slightly different shade. Also, you should consider getting rid of the black lines common to most animations as this will make the character look more solid.



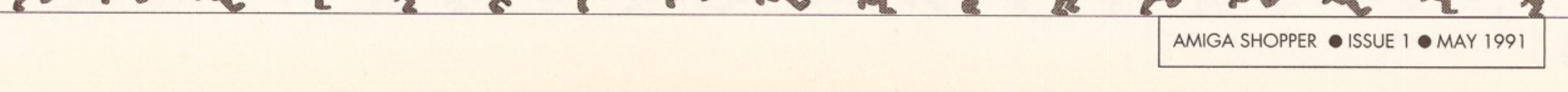
2 I put a few little strands of hair on my character to help emphasise the bobbing of his head. Heads always move up and down in a walking sequence – have a look at people walking down the road. You might try drawing a shallow curve across the screen before you start drawing so you can keep the top of the head under it. This gets away from the 'stringed puppet' syndrome and results in a much smoother and more realistic walking sequence.



3 Here I am putting a bit of shading under the nose using the darker skin colour. This is easy if you draw an unbroken line where you want the shadow to be, and then fill it. This screen also shows the eye that I had to redraw on each cel. It's a real drag editing something over and over, so try to cut and paste as much as you can on the pencil test phase.



4 The palette requester is shown here in all its glory. Using it, you can alter the palettes for each single frame and set the colour cycling. Colour cycling makes it possible to add some exciting extra animation effects to single frames as well as adding a wealth of complex sub-animations to the main thrust of your creation.



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JARGON BUSTING

ANIM: A method of storing animation frames developed by Spartafilm, whereby only the changes between successive frames are stored, thus saving significant amounts of space.

DITHER: A technique for simulating more colours than are normally available by placing different coloured pixels close together

HAM: Hold And Modify is an Amiga graphic mode allowing all 4096 colours to be displayed at once, with certain restrictions.

IFF: Interchange File Format is a means by which data from different graphics or sound sampling programs is saved in a compatible way.

PIXEL: A picture element - one of the thousands of tiny rectangles that make up a computer screen. A pixel is the smallest addressable area on the screen, so a screen's resolution is measured in terms of number of pixels displayable across by number of pixels down.

SMUS: Simple Music Format is a subclass of IFF, used as a standardised way of storing musical scores by programs such as Sonix or Deluxe Music Construction Set.

all the memory with animations.

Although there is a brush making clip tool in pencil test, there is no brush mode in Ink & Paint. This means that when you colour in something, like the eye in my example tutorial, you have to laboriously draw it in in each frame.

I don't know why, but the editing pixel is painfully slow in magnify mode. This makes repeated touch-ups, again like the eye in my example, very labour intensive. I thought the whole point about computer graphics packages was that they were supposed to be fast and easy to edit. *Animation Studio* is actually one of the slowest graphics packages I've ever used.

Also, the oddest thing, but although the Ink & Paint and Pencil Test modules are linked, they don't pass the data between them. You have to load the CFAST file again when you switch from one to the other. I suppose it's nice to load the next program just by a menu selection, but this is no good if you have restricted memory. If the modules don't communicate then why not just have them as two separate programs and have done with it?

In real animation, the backgrounds are static and the cels are laid over them. The backgrounds don't change because they are separate from the cels on which the characters are painted. This is the way it works in *Animation Studio* too, except in this case the backgrounds are IFF files imported from other sources. You have to be careful about how your characters interact with the backgrounds and they have to be clipped to go behind objects. If a character walks behind a wall, all but the bit that sticks over the top has to be erased. For the future, I can imagine a way you could map your

> ***"So, is this the best Disney product since Disney dropped the Walt and became a mega-corporation?"***

characters on a HAM background picture, and even move several planes at once in front and behind the animation. But you'd need about 8Mb of RAM just to get started with that sort of caper, so it will have to wait until they perhaps do the professional version I've been hinting about. (Are you paying attention to this Disney?)

Although *Animation Studio* does feature music scores (SMUS format only) and sound effects, I haven't mentioned them because sound takes up a lot of room and if it's animation you are interested in then this won't bother you too much. All the demos except one were silent, and the one that did have sound just went 'boing'. So it handles samples and music, but no variety of input files was available. You'll have to bolt on a tracker module as an executable file or something if you want more interesting or longer tunes.

And finally, the thing that really got my goat was the copy protection using the original disk as a key disk. Aargh! It asks for the original disk every time you boot one of the modules. This is very tedious, and I wish people would pack up using this kind of copy protection. It doesn't stop concerted pirates, as they know how to get around this sort of thing easily. And the program is no fun without the manual, so why bother with copy protection anyway? I hate it, I hate it! Please, in future let's have a manual-based, check it once only, tap in the password-type copy protection system.

The End

So is this the best Disney entertainment product since Disney dropped the Walt and became a mega corporation? Well yes and no is the short answer. The longer format of that is that although the program is excellent as an educational tool for budding animators, it falls way short of being a professional tool in any way shape or form, in spite of its massed features. The lack of any print out routines means that you are confined to the production of animations that will fit into and play from your Amiga – fine if you have a big memory, although I challenge anyone to have enough memory to run a full length short, let alone a 90-minute film. I can't decide if it's an animation tool or an educational program. Or is it just another method of selling Disney merchandise – do they really need another excuse?

Is it a 1990s version of those little Chad Valley projectors – the sort you cranked with a handle which showed you a 20 second clip from some famous Disney short? In any case, testing the program proved that Disney's software division has the talent to provide state-of-the-art Amiga programs. Now all they have to do is turn out a pro version and we could see all UK animation production being done on Amigas.

Okay, roll the credits... AS

SHOPPING LIST

Disney Presents
***The Animation Studio*..... £99.95**
Distributed in UK by:
Entertainment International
4 The Stannetts,
Laindon North Trade Centre,
Basildon, Essex SS15 6DJ
☎ 0268 541212

CHECKOUT

Ease Of Use..............6/10
Although animating and the use of onion-skin techniques gives you a lot of graphics power, the editor itself drops points by being a bit cack-handed. Not as good as *DPaint*, so it might be wise to knock up your key frames in *DPaint* or scan them in. Too slow by half.

Speed.......................4/10
Slow is too fast a word for it really. I don't know what the program is doing to take up so much of its time, but it's obvious the programmers don't know much about making the Amiga fly along on the blitter.

Artistry.....................8/10
Animation skill is the best description. If you weren't a brilliant animator before you started, you will be in the end.

Output.....................0/10
As there is no form of output except to the screen, this is the poorest aspect of the program. Not a professional piece of kit by any means.

Graphics Handling....7/10
Does some very neat tricks, and if you have *DPaint* as well, you can really do some very hi-tech stuff. Except for its editing, this is a very slick package.

Educational...........10/10
You learn more tinkering about with this package than you do from a pile of the most expensive animation books. It takes you through all the important aspects of animation from start to finish.

Colour....................10/10
The colour handling of the program is very special as it allows a different palette for each frame of your animation. If you have a large amount of memory this can allow very subtle and ever changing shading effects.

Tools.......................7/10
Some very unusual tools, and some very basic and boring ones. A nice enough mixture though, and enough for you to create very sophisticated graphics.

Documentation.......10/10
Top notch, and a very attractive book to leave lying around. It's not a bad read in itself, as it is chocca with Disney characters and background on animation and technique.

Price Value..............6/10
A tad too expensive for a bit of fun, though with the facilities offered for importing and exporting perfect animations to other packages it is very good value, but as a rather large utility rather than a stand alone package.

Overall................68/100
A glossy and entertaining package, which only loses points for not really knowing what it wants to be in life. Falling between two stools either means you can't decide what you want to be, or it means you have no idea of the market you're going into. As a way of rendering animations for export to other ANIM format packages, it has no equal.

LAUGH LINES

We are on the lookout for cartoonists who can do two things (if not more) – One, draw good cartoons or a strip on the conventional media or the Amiga. Two, make them funny. The second part is the most important and the most difficult – if it doesn't make us at least chuckle, then it simply will not do. And we'll even pay you for them, so earn some dosh by sending your cartoons to : Funnier Than Bob's Ears, Amiga Shopper, 30 Monmouth Street, Bath BA1 2BW

Can I CIX It?

Stewart C Russell investigates a system with nine gigabytes of diskspace, nearly 6000 users, support from Commodore and definite Surbiton tendencies

Compulink Information eXchange, CIX (pr. kicks) for short, has made quite a name for itself since it opened a little more than four years ago. It grew from a user group owned by Frank and Sylvia Thornley, CIX and is now an electronic conferencing system quite unlike any other in this country.

So what is an electronic conferencing system when it's at home? Well, it's like a big common room where ideas, news and chatter can be exchanged. Like all common rooms, little huddles of like-thinking folks get together to discuss their interests. However, unlike any common room, everyone can meet in the comfort of their own computer rooms and not everybody has to be present at the same time to take part in a discussion.

> *"BBSs offer inane chat and useful help limited only by your telephone bill"*

Without computers, modems and telephone lines, this sort of thing would be impossible. Add to that electronic mail for confidential user to user talk, and programs to download too, CIX could prove to be the perfect way to win friends, influence people and soundly bosh your telephone bill into hyperspace.

CIX runs on a large Sequent s27 multiprocessor machine and the software is based on CoSy – the University of Guelph's Conference System – which runs under Unix. The Sequent has 32Mb of RAM and is networked to the file servers which handle the multiple telephone lines.

All this power may seem excessive, but do remember that CIX has the facility to support more than 60 users at one time.

Electronic Mail

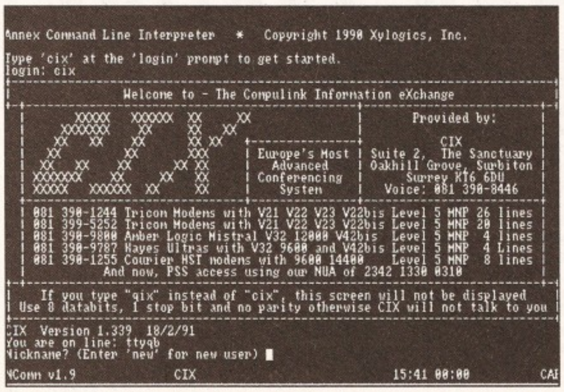
Electronic Mail (email) is the simplest part of CIX. It allows CIX users (CIX jargon calls users 'CIXen') to send confidential messages to one or more users. Unlike paper mail, email is delivered instantly and wastes no trees at all. Green computing lives.

CIX has email links with JANET, the UK's university mail network, and Internet, the giant international network which has links to everywhere. Although mail within the UK is free, sending or receiving international mail costs 3.3p per Kilobyte. Unlike many electronic mail services, CIX allows you to send binary mail; you are not limited to purely text mail. This means that you could send pictures to one another and it gives us hard-pressed journalists the chance to archive an article, together with its screendumps, for close deadline work.

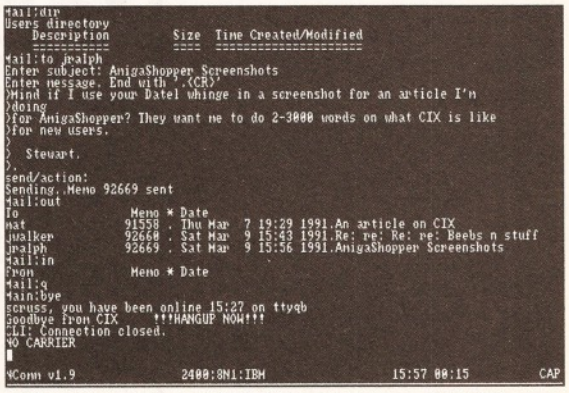
If you need an instant response to a question, you can try CHATting to another user. The user you want to chat to must be online to CIX and must be available for chat; in other words, not entering a message or downloading a file. Chat can be a fun, but not very rapid, method of

CONNECTING TO CIX

If you want to join CIX online, the numbers to call are 081 390 1244 or 081 399 5252. These lines support V21 (300 baud), V22 (1200 baud), V23 (1200/75 baud) and V22bis (2400 baud) with MNP up to level 5. The usual 8 bits, no parity, one stop bit applies. Other lines support 9600 baud in both V32 and HST standards, and with MNP 5 data compression you can get up to 19200 baud out of CIX. You can find out about those faster lines once online.



Welcome to the machine ... the above screen greets you when you first set out to get your CIX.



Crib words and pictures from your mates via the telephone line and bypass the Post Office.

BEGINNERS START HERE

Using computers over telephone lines is nothing new; before the advent of the desktop machine it was common practice to rent time on a large mainframe some distance away from the terminal. The user communicated with the mainframe computer via a teletype, which was basically an unholy (and unreliable) alliance between a typewriter and a telephone.

Computers cannot send digital voltages down the telephone line. Instead they use a modem to modulate transmitted data onto a high-pitched audio tone and demodulate the received data from the same tone. You'll have met a modem if you have ever phoned up a fax machine by mistake; the screech they make is a modem trying to make a connection with another modem.

With just your Amiga system, a cheapish modem (around £150 for a 1200-baud model) and some PD terminal software (absolutely free) you can access local Bulletin Board Systems (BBSs).

These are a supply of inane chat, useful help and freely distributable software, limited only by your phone bill. Many BBSs are linked to the Fidonet, a worldwide network of hobbyist comms users that offers discussion forums and cheap (but rather slow) international mail.

The same kit will get you access to commercial services like CIX but, as they tend to charge for the time that you are online, it's a neat idea to have a fast modem.

It's possible to spend over £1200 on a truly intense modem, but a bog standard Amiga is not even powerful enough to drive them to the full. You'd better save your pennies for an A3000 ...

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continued from page 55

We've got a Conference, and we're going to use it

Before the preview copies of *AS* hit the shops, we had our own conference on CIX. It's called (not surprisingly) amigashopper. Such was the interest in a serious Amiga magazine that the conference was generating comments even before any other CIXen had been told about it.

There are four topics in the amigashopper conference:

- **General – Anything to do with the Amiga and *AS* goes here.**
- **Complaints – Want to complain about a product, a supplier or (perish the thought) *AS*? Here's the place to whinge.**
- **Letters – Letters to *AS*, the best of which will get printed.**
- **Files – Useful bits of FD software for downloading.**

Various *AS* people will be around the conference; Jeff Walker and Phil South from time to time, and the whole thing is moderated by me, scruss@cix.

getting your messages to and from other people.

Conferences

There are well over 1000 conferences on CIX. Some of those are closed conferences; only authorised CIXen can access them. The Amiga Developers' conference is an example of a closed conference, since Commodore would not want sensitive information leaked to the general public.

> *"CIX offers more than 30Mb of the best in free Amiga software."*

Anyone can start a conference, on any subject under the sun. If your burning desire is for a standing-on-one-leg-and-whistling-Dixie conference, so be it, but it wouldn't be much of a conference since you might be the only member.

The Amiga conferences are always full of new messages and comments and cover every aspect of using Amigas. According to Matthew Sims (one of the CIX System Operators) there are well over 500 active Amiga users on CIX, and the Amiga conferences are some of the busiest on the whole system.

Piles of files

Even the most humble BBS offers files for downloading. CIX offers over 30Mb of the best freely distributable Amiga software. This may not sound much, but this software gets updated and added to regularly. Most of the files are utilities, although there are a number of music files.

Files are kept in conferences, but in special areas given an FLIST, or File List. To get a file, you browse the file list until you find what you want. CIX supports X, Y and Z Modem, and the Kermit protocol. Put simply, that means any piece of terminal software for the Amiga will be able to download any of the files.

Now if everyone just downloads the software on offer, CIX would be left with a very few, very ratty files. It is down to you to upload your own software, but it won't get posted for everyone to download before the conference moderator has checked the program out properly.

Usenet

The Usenet news service was one of the things which kept the very early Amiga community together. Similar in concept to CIX's conferences, Usenet is a worldwide forum on a huge variety of topics.

Most of the real Amiga news happens on Usenet first; thus if you have access to Usenet, you'll be able to follow some of the discussions.

CIX's Usenet feed is read only, so you won't be able to post anything there. Usenet does have some very talented programmers using it – Matt Dillon, Steve Tibbett and Jack Radigan (JR-Comm) make frequent appearances, and chip in with their useful hints.

Save Time & Money

CIX costs money, and that's something we all want to save. A piece of software called Query is available to do just that. It allows users to use NComm to log onto CIX, read all their unread messages, archive them together, download them and then log off.

The Query software then takes over, giving you the chance to compose answers without the telephone charges ticking away. Once you have answered everything, the program archives your replies together, dials up CIX, and pumps your replies down the phone line. This technique is called 'blinking', reflecting the short times that users can spend online.

Query only works with NComm at the moment, and is still in the beta-test stage. It does work, but is not recommended for the first few times you call CIX, unless you like downloading 500K of old and mostly irrelevant conference comments.

Is CIX for me?

Do you really need CIX? Well, some companies give their best product support on CIX, so it might be a wise idea if you use applications packages a lot. Commodore people have been known to lurk about on CIX, and who better to ask about our favourite machine?

If you are heavily into comms and want to use a professional service, go for CIX. If you're a comms beginner then it would be best not to go to CIX until you've learnt enough of the ins and outs to be able use it properly. AS

Jargon Busting

ARCHIVE: Separate files may be archived by being compressed into one file, smaller than the sum of its parts and hence cheaper to transmit. Unarchiving restores the original files , retaining any directory structure in which they are organised.

BAUD: The number of possible changes in state per second on a transmission line. For simple protocols (V21, V22) there are only two possible states, so baud rate is equivalent to a measure of bits (binary digits) per second. V32 makes use of more possible states and clever coding techniques meaning much more can be sent at the same baud rate.

MNP: An error detection protocol, with 9 levels of increasing sophistication. If an error is found, the sender will re-transmit the offending segment of data. Level 5 also compresses data before transmission and decompresses it on reception.

PARITY: A simple form of error checking where an extra bit is included with each group of seven data bits. There are two types: even and odd. For even parity, the data bits are summed; if the result is odd the parity bit is set to one, otherwise it is set to zero. The opposite is the case for odd parity. On reception of the data, the eight bits are summed and if the result is odd (for even parity) then an error has occured.

V21, V22: Standard protocols for modems defining baud rates and control codes.

XMODEM, YMODEM, ZMODEM, KERMIT: These are different software protocols used for transmitting and receiving data.

Shopping List

One-off registration fee: (£15 + VAT)	£17.25
Usage charges: (£3.10 + VAT)	£3.56
Per hour, peak (£2 + VAT)	£2.30
Per hour, off-peak monthly min (£6.25 + VAT)	£7.19

All CIX billing is via credit card. Remember to add the cost of a telephone call to London to these prices. A rough guide to these are 76p an hour off-peak local and £4.71 for one-hour off-peak long distance.

If you plan to live on CIX, it might be cheaper obtaining a PSS account from BT; this allows you to access CIX for the cost of a local call. The initial charge for PSS is £60, plus a quarterly charge of £15.

Compulink Information eXchange
CIX: Suite 2, The Sanctuary,
Oakhill Grove, Surbiton,
Surrey KT6 6DU
Voice Telephone:
081-390 8446

Checkout

Services 23/25
International and local electronic mail, conferences on every subject under the sun and more files to download than the mind can comfortably take in; could anyone ask for anything more?

Cost 20/30
At £7.20 a month (plus phone charges) minimum, CIX is a considerable expense. But the features on offer are either unavailable on any other system, or would cost far more.

Manual 6/10
Short, and only gives just enough explanation to get you started on each subject. It is adequate for the majority of users though.

Feedback 17/20
Plenty of people who know and love the Amiga use CIX, so any questions you ask will be answered promptly and (usually) correctly. The system operators are very helpful too.

Amiga Specifics 12/15
Amiga people make up some of CIX's most active conferences and just about every special topic is catered for. The newest and best FD software always gets onto CIX first.

Overall............... 78/100
Although CIX has its fair share of techno-poseurs, it's a valuable source of advice, news and good chat. Of all the information systems in the UK, CIX is currently the best value.

Genlock and load

Gary Whiteley tests Vidtech International's VM-2 Genlock

VIDEOMASTER VM-2 GENLOCK

According to the typewritten A4 manual, the Videomaster VM-2 Genlock is a full-function, state-of-the-art, broadcast quality genlock that features the latest analogue and digital design techniques and is equipped for both component (Y/C) and composite video applications. It comes equipped with a small selection of special effects (wipes), a built-in colour video splitter (for connecting directly to video digitisers) and dissolve controls. Two optional extras are an external power supply (if you don't want the Videomaster to take its power from your Amiga) and a cable which will allow automatic colour digitising with *DigiView Gold*.

The VM-2 is an independent unit which will work with all Amigas (even the 1000). With the exception of the A500, the VM-2 will fit snugly between your computer and monitor and, being of a similar colour, it blends in well.

Working the VM-2

I tried several experiments with the VM-2, using it for laying graphics over video and digitising. I tried various video sources, including a Panasonic F-10 single chip colour camera (which I often use for digitising), a Lo-Band U-matic (0.75" industrial standard VCR) and a VHS VCR. I also tried the unit with an Amiga 500 and an Amiga 1000. I'm also hoping to try S-VHS and Hi-Band U-matic and I'll report back when I have results.

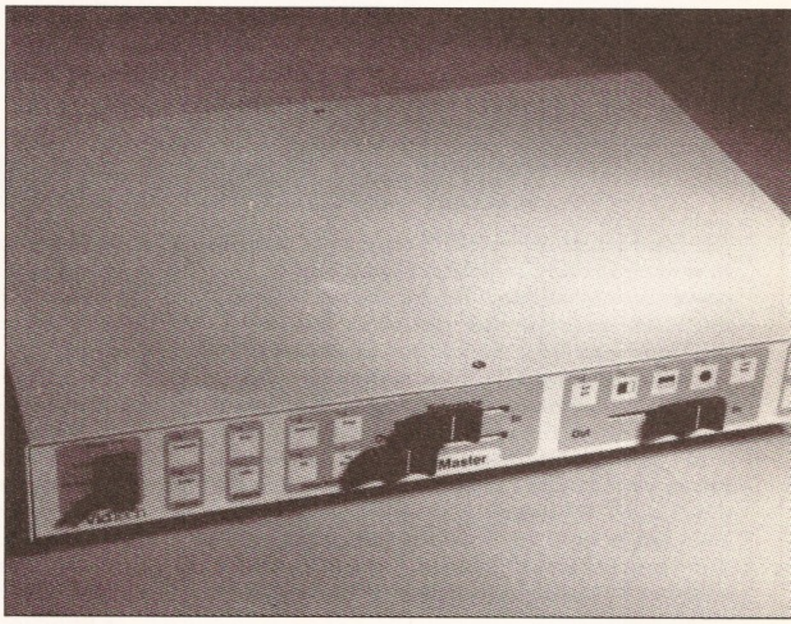
First, let's deal with the Genlock functions. As with all video applications, the better your signal quality, the better the results. I found that a graphic overlaid onto a domestic VHS signal was noticeably less stable than one laid over Lo-Band U-matic or the video camera signal. After I'd made some adjustments to the side panel controls, I tested the unit using a variety of paint packages and video titlers. None of the software I used caused any additional video problems. With each of the different sources mentioned above I noticed there was an amount of 'rippling' on both my Amiga screen and video monitor. This seemed to be more obvious with the Amiga 500, possibly because its power supply may not be enough to drive both the computer and the VM-2. This was most obvious in those strongly saturated colours such as red and deep blue, which often cause problems. Colour crawling was also evident (making the vertical edges of graphics appear to be shimmering). However, these are problems that may be curable by some internal adjustments to the VM-2.

Let's get digital

Now for the part I was most looking forward to – digitising. I followed the instructions, connected my video camera and *DigiView*, loaded up the software, set up my shot and off I went. I'm sorry to say that I was rather disappointed with the results. There was definite evidence of herringbone-like patterns over parts

INSTALLATION

The VM-2 plugs into the RGB monitor port of the Amiga via a hard-wired cable. The RGB output can then be routed from the VM-2 to your Amiga monitor, although the manual refers to connecting an S-VHS output to the chroma and luma inputs of the Amiga monitor, which is not possible on European models. Other connections are made from your chosen video source (VCR, video camera or other video source) and to your recording VCR or other video equipment. The video source can be either Y/C format (ie S-VHS or Hi-8) or composite. A Y/C cable is provided with the VM-2. The input video signal can be looped back out for monitoring or other purposes. Two composite and two Y/C outputs are provided, so that you can also connect your Amiga or other composite monitor to see what's going on. There is also a Key Out, which allows output to a chroma-keyer or external video mixer, and an RGB splitter output for connection to your video digitiser. All composite connectors are industry-standard BNCs (British Naval Connector), while the Y/C connectors are 4-pin miniDINs.



Vidtech's VM-2 offering joins the host of genlocks on the market, but brings with it its own quirks and a tendency for the knobs to fall off.

JARGON BUSTING

CHROMINANCE: The colour hue and saturation information in a video signal.
COMPONENT VIDEO: This is where various component parts of the video signal, such as chrominance and luminance are kept separate from each other. This can give a better quality picture than composite video as the components can be processed separately. An example of a component video signal is the Y/C format used in S-VHS, Hi-8.
COMPOSITE VIDEO: A video signal including chrominance (colour hue and saturation) and luminance (brightness) information in one combined signal.
CONTROL TRACK: A track on to which regular pulses are recorded so that the position of the video tape can be read by the VCR as time elapsed etc. Unlike Time Code, index points must be set in order to locate other points on the tape.
GENLOCK: A way of slaving one video source (eg Amiga) to another (eg Video Tape) in order to synchronise their signals together to allow stable wipes, mixes and other effects including overlay (key) between the two sources.
LUMINANCE: The monochrome part of a video signal which carries the brightness information.
MIX: Also referred to as DISSOLVE. One image is gradually faded up across another which is fading down.
NTSC: National Television Standards Committee. This is the name for the TV colour coding system used in the USA and other countries. It has 525 lines, running at 60 fields and 30 frames/second. It is often, and perhaps unfairly, japed at as Never Twice the Same Colour by PAL standard users.
PAL: The other main TV colour coding system (with the exception of France's SECAM system), which is in use around the world and was developed by Britain. PAL refers to Phase Alteration Line. In fact, there are several hybrid PAL systems in use, all of which are slightly different.
SEG: Special Effects Generator, also referred to as a Vision Mixer. A piece of video equipment that allows video transitions and effects to be made, eg wipes, dissolves, keys and so on.
SUBCARRIER: A 4.43361875 MHz signal that is used to correctly set the colour phase of the video signal.
WIPE: Describes a visual transition between two images, where the edge of one progressively obscures or reveals the other.

continued on page 58

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of my scans. Having seen this problem before, I tried my trusty noise-reduction filter on the video splitter output (thanks to David Howarth of Stockport for letting me in on this little gizmo a couple of years ago – if anyone has any enquiries about this I'll pass them on to him). Unfortunately, this time it couldn't do the business. So, thinking the problem may have been with my equipment, I went back to basics and ran *DigiView* in the usual way. I had to conclude that the VM-2 was causing the trouble. I also experienced some strange problems when I connected the Auto cable. The first time I ran the splitter in Auto mode, it worked fine (apart from the previous problems). From then on, every other time I ran Auto, the first scan (whether it was R, G or B didn't seem to matter) was a complete mess – just a hash of vertical lines. Maybe the test unit was duff. Or maybe the VM-2 just doesn't work properly. Also, I wasn't too impressed with the colours, but to be fair, *DigiView* does require some setting up to get the best out of your system.

There were no problems with the dissolve controls. Likewise with the wipes, except when using slower transitions. You may worry about the slightly steppy digital edges, though I think a serious video user would either want a few more than this or wouldn't really use them anyway as they'll more than likely be using the VM-2 linked to an external SEG. As the wipes stand, it would be far more useful to have a way of positioning them so that they could be used in other places on the screen (positioning the circle to highlight a feature in the video while the graphics refer to the highlight). AS

SHOPPING LIST

Videomaster VM-2 Genlock ... £799
by Vidtech International Inc
2822 NW 79th Avenue,
Miami, Florida, USA
☎ 010 800 722 2261

Distributed in UK by:
Power Computing Ltd
44A Stanley Street,
Bedford, MK41 7RW
☎ 0234 273000

THE MAIN CONTROLS

The front panel of the VM-2 consists of a series of membrane key switches, faders and a power source selector. Taking the latter first, the power source switch can be set to three positions – up is for Amiga power, down is for the optional external power source (which I didn't have available for testing) and a central position where the unit power is off but the RGB signal is still passed through to allow you to use your Amiga monitor normally while the VM-2 is off. Taking the rest of the control panel from left to right we have the following:

● Reference Format Selector – to tell the unit whether it is using component or composite video input.

● Video Output Selectors – here the output of the VM-2 can be determined. You can choose between Reference (incoming) video only, Amiga only, Key (which overlays all the non-colour zero Amiga graphics over the reference signal) or Key Reverse (which allows the reference signal to be seen through the non-colour zero graphics).

● Dissolve Controller Panel – these are two horizontally mounted faders which are manipulated to determine the amount of both the reference and Amiga signals which are output. The levels can be adjusted from fully off to fully on for both sources, allowing the mix of one with the other to be set. Live mixing can also be performed during recording. These controls are used in conjunction with the Key switches.

● Wipe Selector Panel – there are three simple wipes available; circle, horizontal and vertical. These can be used singly or in any combination. They are preset as to where they appear on screen and their positions cannot be adjusted. So a circle wipe will always travel in or out from centre-screen, for instance. Another horizontally mounted fader can be used to manually control the movement of the selected wipe, or automatic control can be selected. In automatic mode the wipe will take place over a preset (though adjustable) time. If the Invert Wipe key is selected, then the wipe will occur in reverse – either manually or automatically. The order of the wipe transition will also depend upon which of the Key switches is selected.

● RGB Splitter Panel – this is where you select the red, green or blue video output to send to your chosen video digitiser. If you have Newtek's *DigiView Gold* system then you can do this automatically using an optional cable, which connects between the joystick port of the Amiga and the VM-2, and the Auto function in DigiView. Users of other digitisers must use manual selection.

In addition to the easily accessible controls described above, there are six recessed potentiometers on the right hand side of the VM-2 which allow fine tuning of the unit to work within your video set-up, although the HUE adjuster is only used on the American NTSC version of the VM-2. Variously, these controls are:

● TIME – used to set the transition time of an automatic wipe. Adjustable from two to eighteen seconds.

● POSI – this adjusts the horizontal position of the graphics in relation to the input video.

● LUMA – for setting the brightness of the graphics (luminance control).

● CRMA – for setting the brilliance of the graphics (chrominance control).

● SUB – is used to fine tune the subcarrier of the reference video in order to produce the correct colours. Often used to correct colour deficiencies caused by long cable runs.

Also, for the technically minded, there is a set of four DIP switches on the rear of the VM-2 which are set to provide the necessary 75-Ohm loadings for the incoming video signals (set to Hi-Z for when a signal is to be looped out again, or 75 Ohms if not). However, whether you're a boffin or not, these need to be set correctly in order to ensure that your video signals are at the proper levels. The VM-2 manual shows the correct way to do this.

CHECKOUT

Documentation 8/10
Basic, functional and mostly understandable for those who can work out solutions to the few problems, such as connecting the monitor – mentioned previously. There's also a glossary of technical video terms.

Ease Of Use............10/15
Installation is straightforward and the unit is not difficult to operate, once set up, although I had reservations about the fader layout and the membrane keys (see Construction for further details).

Features...................8/15
I liked the idea of the built-in colour splitter. Shame I couldn't get it to work properly. Also, I think that the wipes are not of particularly great value unless they're all you've got. S-VHS is probably a good idea, though I don't think it's as popular yet as was hoped. Looping signals through is good thinking. Features such as Key Reverse may occasionally be of use, similarly the Key Out signal to those with access to an external SEG.

Construction 9/15
The box is solid enough to support an Amiga monitor and measures 14 by 10 by 1 3/4 inches. I'm also glad to see BNC connectors, which are solid and durable and make positive contact. Personally, I didn't like the membrane keys on the unit, finding them difficult to activate accurately. I wasn't too keen on the horizontal faders either, but it would be impractical to mount them any other way on a unit like this. The power selector may be vulnerable to accidental movement. The fader knobs also come off fairly easily.

Quality 10/15
I have to reserve some judgement on quality here, as I didn't have chance to test the unit on equipment that is considered to be of broadcast quality in this country (such as Hi-8 or Betacam), so obviously what I put into the VM-2 was reflected in what came out. The VM-2 is certainly adequate, though I think it could be better.

Price 17/25
At £799 this unit is fairly well priced for what it is, but I'm not sure if the extra functions are worth what must be an extra cost, particularly considering that there a number of other genlocks and SEGs on the market that will do all the VM-2 does (except colour splitting) for a comparable price. As usual, deciding what you really need, and then shopping around for it, has got to be the order of the day.

Overall 62/100
The VM-2 is not really the state-of-the-art piece of kit that the manual says it is. It is certainly a functional unit and, if some of the apparent problems that showed up under test were ironed out, it would be a more useful addition to one's video arsenal.

On the buses

David J R Ward reveals the workings of the SCSI

SCSI, pronounced 'skuzzy', is the short name for the Small Computer System Interface. It was developed to provide a high performance system for the interconnection of computers and peripherals, and being bus-based, allows data to flow in both directions.

You probably know SCSI best when it's used to interface a hard disk drive to a computer, but it will work with any similarly equipped peripheral such as printers, tape streamers or CD-ROMs. It is currently fitted as standard in the Amiga 3000 and as a bonus in the A590 hard disk for the Amiga 500. In the A590, though, the interface is not used by the Amiga 500 unless another SCSI peripheral is connected.

Data express

The best way to visualise a bus system is to imagine a stretch of railway track with a number of stations along its length. Each station can send or receive a train along the same set of lines, but only when the track is clear. It follows that the whole system must be carefully regulated, with signals and messages to stop trains leaving stations when the track is already occupied. If each station was connected to every other station by its own separate tracks then the whole system would be over complex and difficult to build. In SCSI our single railway track is eight data lines, one for each bit of data so a byte can be transferred in one go.

The SCSI bus can connect eight devices, one of which is the host computer. Each device has an ID address, written in binary code and set up by switches on the equipment. It acts as a device identifier and is used to enable two devices to communicate across the SCSI bus.

Past, present & future

SCSI was originally developed from SASI, the Shugart Associates Systems Interface. This interface was slow, unintelligent, and single-user. The industry stopped using it about eight years ago. However, early Amstrad 1512 machines were fitted with SASI-equipped hard drives. A fast, high performance system was needed, capable of handling multiple devices. Hence SCSI, the most versatile interface on the market.

SCSI is under continuing development, with SCSI-2 in the wings. This will have 16 or 32-bit data lines and more message commands. Synchronous transfer speed has been doubled to 10MHz, so when taken in conjunction with the increased data transfer, SCSI-2 can theoretically shift data at 40Mb per second. SCSI-1's top speed is 5Mbps. No need to worry though, as son of SCSI will be fully compatible with his dad.

Differential driver

As most users are local (printers and such) a SCSI peripheral is usually equipped with a single-ended 48mA driver. This allows it to transmit up to six metres. Differential drivers give greater range, but as the pin assignments are different, the two drivers cannot be mixed in the same system. Software drivers are another matter. Earlier interfaces required specific software for each different device. With SCSI they are independent of the final device, thus allowing any data to be transferred to or from any media. This places the onus of reading or writing the data on the SCSI controller.

There are two types of controller, each with its own memory. The embedded controller is built in with the disk drive mechanism and, because of space limitations, is usually 8 to 16k in size. The bridge controller, on the other hand, can be separate from the peripheral and may have up to 16Mb. With hard disks, system speed is greatly improved with a large buffer. This is because 'look ahead prefetch' can be used. When the controller is requested to read certain sectors of a disk, it will also read adjacent sectors that have not been requested. Nine times out of ten the next read request will be for those sectors, so read time can be reduced by transferring the data from the buffer. The FastFiles-System used to format Amiga hard disks ensures that related data is stored in adjacent blocks, thus making full use of cache memory.

As I said earlier, peripherals can send, receive or do both. When a device wishes to send, it is known as the Initiator. The receiving peripheral then becomes the Target. The two will then communicate Asynchronously – that is, by using start/stop bits to separate each byte of data sent down the lines. If both devices support Synchronous transmission then they will switch over to be more efficient. Synchronous data transmission requires both devices to be in sync. This is achieved with the use of special message bytes sent before the main data. As there are no intervening start/stop bits, the whole transaction is faster. Up to twelve bytes can be sent without acknowledgement, depending on the number decided in the message phase.

SCSI BUS SIGNAL DEFINITIONS **Figure 2.**

Initiator		Target	
<-------	REQ	-------	
-------	ACK	------->	
-------	ATN	------->	
-------	BSY	------->	Control signals
-------	SEL	------->	
<-------	RST	-------	
<-------	C/D	-------	
<-------	I/O	-------	Phase signals
<-------	MSG	-------	
<-------	DATA	------->	
<-------	PARITY	------->	Data signals

Hold very tight

In figure 2 we can see that there are three types of signal, Control, Data, and Phase. There are also three types of Phase signal, Command and Status (C/D), Data In/Out (I/O), and Message (MSG). Command and Status are used to interrogate the Target. Data In/Out is fairly obvious and the Message signal enables two devices to determine how they link up and act. A list of messages is given in figure 3. The control signals look after the flow of Data, Commands and Messages, as well the overall operation of the bus.

If the BSY signal is on then the bus is active and any devices that wish to transmit must wait, otherwise any data already on the bus would be corrupted. When this signal goes off, the waiting peripheral switches on its own BSY signal and transmits its own ID address. If more than one device is trying to access the bus, the device with the higher data bit goes first. This phase is known as device arbitration. The unsuccessful peripherals must now wait until the bus goes quiet again before they can re-arbitrate for bus control.

The winning peripheral now begins device selection. With the BSY signal still active, the Initiator instructs all the other devices that selection is taking place by switching on the SEL signal. It then transmits the Target's ID as well as its own on the bus. The Target device responds by activating its BSY signal. The Initiator now goes quiet but listens to the Target's BSY signal. If it remains on then device selection was successful.

If the Target supports Synchronous communication it will send the 'Offset interlock data transfer request' message. This tells the Initiator to switch over from Asynchronous mode if it supports the faster transmission method. AS

SCSI MESSAGE TYPES

Figure 3

From Target.

- Command complete
- Disconnect
- Initiator detected error
- Link command complete (LCC)
- LCC with flag
- Modify data pointer
- Restore pointers
- Save data pointer

From Initiator.

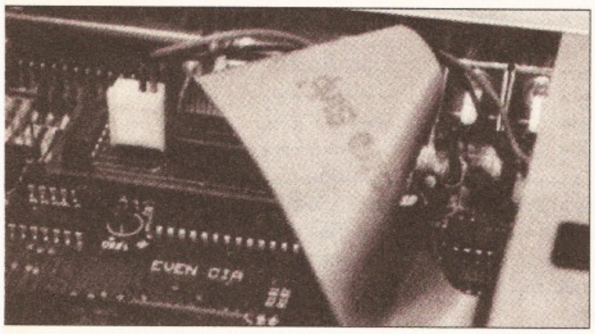
- Abort
- Message parity error
- No operation
- Reset bus device

From both.

- Extended identity
- Identity
- Message rejected
- Offset interlock

Click off

Mark Smiddy gets our occasional hardware series off to a fine start by demonstrating how to build your own anti-click board for use with the Amiga



If you're suffering a nervous tic from incessant click, then you will certainly appreciate the benefits of the quiet life with this extremely cheap, very handy and easy-to-build anti-click gadget.

Welcome, one and all, to the butcher brigade. This series is all about doing things to your Amiga that will make Commodore's design team get very nervous for the safety of their baby. This little beauty is a device to stop that annoying click when the machine is waiting for a disk. As promised in the sneak preview, this project shows how to build one of your own. This project is easy-ish, but since Amigas are expensive beasts, I'd like to clear up a few points before we start:

- All the projects are based on tried and tested products that are already on general sale. Where possible, we have arranged a special price for the completed kits, fully tested and ready for construction.
- A full kit of parts (excluding cases, nuts, bolts etc.) will be available from the manufacturers along with a PWB. Unless a special case arises, we will not be running PWB overlays or complete circuit diagrams. This is to prevent the over-adventurous attempting to bodge circuits together on copper clad stripboard, then expecting them to work.
- This series is about electronics projects. If you don't know which is the hot end of a soldering iron, either buy the modules ready-made or enrol in a good night-school class. Many of the projects can potentially damage your machine if built or fitted incorrectly. If in doubt, get an experienced engineer to check and fit them for you.
- MAINS ELECTRICITY KILLS!

I cannot stress this one enough. None of the projects planned for this series require you to go prodding around in the back of monitors or probing around PSUs. Leave that sort of thing to people who know what they are doing. Before you start anything, switch off and unplug the machine from the wall. And leave it switched off for at least 30 minutes to let any residual current dissipate.

Building The Board

You will need:

- A good quality soldering iron (max 17W) with a pencil tip (<2.5 mms). Antex type CS with an 1100 or 1006 tip is suitable.
- Good quality side cutters. Nail trimmers will not do.
- About two metres of 22 swg 60/40 solder.
- A small clamp or vice.
- A scriber or small terminal screwdriver.
- The anti-click board kit.

1: Make sure your work surface is clean and you have all the parts.

2: Study the two overlay diagrams. (Figure 1 is the lower side of the board when fitted; Figure 2 is the upper.) Although tracks have been removed for clarity, the upper side is distinctive because it only has three tracks; the lower side has over 40.

3: If you are using a socket for IC1, solder it in place now. It goes on the upper side of the board on the right-hand side. The notch at the top should face the front of the board.

4: Insert the 20-way IDC socket into the lower side of the PWB (Figure 1) and solder it in place. This is a little fiddly if you don't have a vice. Sticky tape will hold it temporarily.

5: Insert the 14-way ICD socket into the upper side and solder that in place too. Some kits may be supplied with a 34-way socket. This replaces the two separate parts.

BEGINNERS START HERE

The anti-click board is the sort of job the average electronics enthusiast can do wearing sun-glasses and with one leg tied to the bedpost. However, it does require a certain amount of fine soldering and any little solder bridges could be potentially disastrous. Not forgetting there are 90 soldered joints to make on a board that measures just 73 x 23mms. Fitting it to the machine is a breeze and should take about 45 minutes, even if you have never had your Amiga apart before.

The board uses a single, low-power TTL IC which does not require any special handling precautions. Nevertheless, the chip is usually soldered directly to the board, so care must be taken to avoid overheating it. If you are at all unsure, pop out and buy a 14-pin DIL socket from your local electronics' store – Tandy for instance.

Important: Warning and Disclaimer

Future Publishing, the author and Power Computing, or their agents, will accept no responsibility for damage, death or injury however caused by use or misuse of projects featured in this series. We take every reasonable precaution to ensure details are correct, but the choice is up to you.

The anti-click board fits inside your Amiga. This means you will have to invalidate your warranty if you intend fitting it yourself. That includes any extended warranties taken out through Commodore or another third-party supplier. If in doubt, get an appointed Commodore agent to fit it for you. They will be able to ensure your warranty is not jeopardised – if such a thing is possible.

6: Turn the board over, insert and solder the 34-way link pin assembly onto the upper side (Figure 2).

7: Insert and solder the 4-way link pin set alongside the 34-way connector.

8: Insert and solder IC1. (This would normally be done last, but this way avoids accidentally melting the IDC socket on the lower side.) It is essential you get the chip in the right way round or the board will not work. Pin 1 – marked by a notch at

Anti-click board overlays

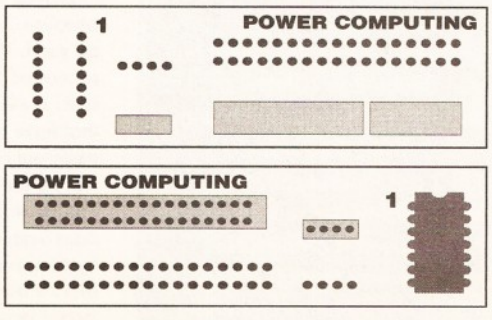


Figure 1: (Top) Female side
Figure 2: (Bottom) Male side

JARGON BUSTING

CMOS: Complementary Metal-Oxide Semiconductor. A special semiconductor material widely used in low-power logic ICs. Such ICs are extremely sensitive to static electricity because they have a very high input resistance. CMOS logic ICs are commonly found in every electronic gadget and have the prefix 40xxx.

DIL: Dual in-line: describes the layout of pins and sockets on many logic ICs and some socket assemblys.

DRY JOINT: A soldered joint is said to be 'dry' when the solder has oxidised slightly during heating and cooling. Dry joints are weak, prone to failure and always due to bad soldering or a poorly prepared surface. Dry joints usually have a dull or pitted appearance.

IC: Integrated Circuit. A tiny circuit etched on a semiconductor. Simple ICs may contain as few as 10 transistors; complex ones like the 60840 may contain over 1 million.

MOS: Metal-Oxide Semiconductor. See CMOS.

PWB: Printed Wiring Board. The correct term for the frequently misused, PCB or printed circuit board. An etched copper-clad board contains wiring connections used to connect various parts of the circuit. The term PCB is better applied to integrated circuits.

TTL: Transistor-Transistor Logic. Silicon based logic IC usually prefixed with a 74xxx or 74LSxxx in for the low power versions. TTL ICs are not sensitive to static but are usually restricted to a very narrow supply voltage – typically 4.5 -> 5.5 volts. The new 74ACxx series TTL chips are based on a CMOS design and are therefore subject to the usual handling precautions.

the top of the case – faces the front of the board. When correctly fitted, two horizontal tracks run off left of pins one and two.

9: Insert and solder the 4-way IDC socket on the board's lower side.

10: Inspect the board for dry joints and solder bridges or other foreign bodies. Using the scriber, carefully chip away any large amounts of residual flux. Be very careful not to damage the PWB.

Fitting the Board (A500)

You will need:

- A small Posidrive screwdriver
- A number 10 Torx screwdriver (a flat-blade terminal driver will do)
- A medium flat-blade screwdriver
- A pair of long-nosed pliers
- Pen and paper
- Time and patience

1: Prepare your workplace. It should be clean, well lit with enough room to work. (A kitchen table covered with tin-foil is good, but don't scratch it. Hell hath no fury like a woman with a knackered dining table.)

2: Unplug the Amiga from the mains and remove all of its external peripherals: mice, hard disks, printer, monitor, etc.

3: Place it upside down on your work surface and remove the six Posidrive screws holding the lid in place – three at the front, three at the back. Your warranty is now invalid.

4: Turn the machine right-side up and gently remove the lid. Do not try to prise it off forcefully or you'll end up damaging it.

5: Look at the plug where the keyboard is fitted to the PWB and make a note of how the wires are arranged. On my machine the black wire is on the left, looking from the front. Using the long- nosed pliers, gently remove the plug. Don't tug at it by the wires! Now remove the keyboard and put it in a safe place.

6: Using a small terminal screwdriver, lift the four tags around the shielding. Do not use your fingernails to lift them as they can be a bit sharp on unprotected pinkies.

7: Using the Torx screwdriver, remove the two screws at the front of the shield and the two at the left-hand side. These also hold a secondary shield in place above the expansion bus. Do not lose them.

8: Note how the ribbon cable and power supply cable are fitted to the disk drive and gently remove them at the PWB end only.

9: Align the completed board above the socket and press it gently but firmly into place. It only goes in one way – with IC1 at the left of the case facing away from the internal drive. Take care not to snag the small axial electrolytic capacitor just below.

10: Replace the leads from the internal drive onto the anti-click board in exactly the same way they went on. On my machine, the red wire on the power lead is the furthest away from IC1.

11: Re-assemble the machine and check to see if it works.

12: If the drive light does not come on, check that you have fitted the board correctly, that none of the pins are bent and that you have fitted the socket correctly.

13: If all else fails, remove the board entirely and re-test. If the machine still fails to work – erm, then you've probably done something nasty. Get an engineer to check it out and don't attempt this sort of thing again. Likely causes are one or more leads missing or transposed. It is very easy to misalign the keyboard connector – and if you do this the machine will refuse to work. AS

PROJECTS IN THE PIPELINE

I've already said this is an occasional series – just how occasional depends on two things: how much feedback we get and how willing the manufacturers are to part with their designs. Power Computing has already started the ball rolling with the anti-click board and has a couple more goodies almost ready to roll.

On the cards for future issues are: an AudioMaster II compatible sound sampler, virus protector, MIDI interface, anti-click board for external drives, and a little gribbly to probe into your fuel bills while you kip; that one should get the grey matter churning over. The rest is up to you. What do you want to see featured in this section? Let me know and I'll do my best to get something done about it. Reader contributions are welcome – so get those irons out and start building.

STATIC PRECAUTIONS

Static electricity is as lethal to your Amiga as mains voltage is to you. The anti-click board is not sensitive to static, but the Amiga is. For this reason, when you are working inside your computer, you should observe normal static precautions:

- DON'T: wear nylon or woollen clothes.
- DON'T: work on hot, dry and sunny days.
- DO: use an approved (resistive) wrist strap when working inside the machine.
- DO: work on a correctly earthed bench.

SHOPPING LIST

Parts list:
Semiconductors
IC1 – 74LS32 quad 2 input OR gate

Others
20 way DIL IDC PWB header socket
14 way DIL IDC PWB header socket
Four way IDC PWB header socket
34 way DIL link pin set
Four way link pin set
PWB

A full kit of parts for the anti-click board is available. Please see details below.

MIDI class

Jon Bates dons his mortarboard and explains how you can get more than you ever thought possible from your MIDI gear

If your attitude towards instruction manuals is the same as mine, you will only refer to them in the direst of emergencies. With both soft and hardware capable of multiple functions it is often difficult to get to the bottom of your musical equipment and get the best out of it. This is not made any easier by the annoying habit that synth/keyboard manufacturers have of putting very few buttons on the front panel, only using a miniscule LCD/LED display and providing a swarm of functions accessed by playing those buttons like an accordion.

> **"There have been cases where there are more sounds in the instrument than you can access from the front panel"**

However there is a page of information common to all MIDI equipment called the Implementation Chart (MIC). If you can read this you will at least comprehend at a glance what your gear can and cannot do and turn that simple keyboard into a raging multi-timbral synthesizer capable of playing several sounds at once from your Amiga.

Knowing what the possibilities are with your instrument means you can cut out all the pages of waffle you're not interested in and get right down to the pertinent details. It is by no means uncommon for an instruction manual to be either ambiguous or muddled in translation when describing attributes. If you can read the MIDI chart then at least you are armed with the certainty of its prowess and merely searching for the way to do it. It is also a simple way of checking the compatibility between two devices; sequencer and tone module for example. Here then is the *Amiga Shopper* beginners' guide to reading those charts.

Taking the MIC

All MIC's have the same layout and terms of reference. If your instrument has two charts you will find that one is for the synthesizer or sound generating section and the other will be for the sequencer section; the chart will tell you. The example I've chosen (see page 66) is from the Roland *RA-50*. This is an intelligent arranger but the sound module section is the ever popular *MT-32*.

The O and X throughout the chart mean Yes and No.

Basic Channel

This tells you what MIDI channels it will send and receive data on. 'Default' means those which it responds to in its raw state and 'Changed' is those you can alter. A tone module does not Transmit any data of its own and so this section, and in fact all the Transmit parts, are marked X for No. It will recognise and work simultaneously on channels 2 – 10 but you can't alter them; you can't get it to work on channel 1 or 11-16. Many instruments let you do this and often the Remark column will say 'memorized'. In other words, it remembers that last channel setting

Frankfurt Music Fair

The Frankfurt Music Fair is one of the largest in the world, with over 1100 exhibitors from around the globe courting punters over a period of five days. If products are to be launched before the end of the summer it is here that companies direct themselves with regard to the European market. The size of the overall fair is so large that it is rather hard to give you a clear idea of its scale. It takes over some 6 exhibition halls and each one of those is about equivalent in size to Olympia/Earls Court.

As far as we are concerned, it is Hall 9 that holds our interest, specialising in the digital side of music creation. Although it is hard to be specific, about half of this hall contained stands for companies that market, develop and generally deal with music software. Alan Hackers from Gajits Software, visiting the show for the first time, said he found it extremely useful as it enabled the company to take stock of foreign competition as well as drumming up interest in their own products. It is worth noting that there is a sizable chunk of music software that does not find it's way over here for lack of distribution, and the fact that the UK is quite a full market.

New Software

Several major pieces of Amiga sequencing software were seen for the first time at Frankfurt this year. *Bars and Pipes* in its ordinary version was launched in the UK in about the middle of last year and quickly gained acceptance because of its easy-to-follow colourful icon-driven screen. It also had a whole range of tools that could add a semi-intelligent aspect to the music and generate new harmonies in many ways. *Bars and Pipes Professional*, while hanging on to the unique method of sequencing, adds many features found on more 'serious' software. It has extensive editing options using music notation as well as graphic and events listing. There is a competent arrange window with cue points, enhanced transport controls, full print-out for scores with lyrics and chord symbols, it will record system-exclusive data and has enhanced quantize and loop features. One page emulates a mixing desk enabling you to automate the mix by including pan, velocity, track muting and volume as part of the sequenced data. Like the present version, *Professional* requires a minimum of 1Mb memory. The final UK price is yet to be fixed but it should be here well before the summer.

Steinbergs' long awaited *Pro 24* for the Amiga has been out in Europe for several months. We should be



The Frankfurt Music Messe has to be the slickest event on the music industry calendar, with giants like Commodore mounting huge displays.

continued on page 64

continued from page 63

JARGON BUSTING

MIDI: Musical Instrument Digital Interface is a standard devised by electronic instrument manufacturers, allowing a number of synthesisers to be controlled by a single keyboard or sequencer.

MTC: MIDI Time Code is a means by which MIDI instruments are synchronised.

MULTI-TIMBRAL: The ability of a synth to play different notes using different voices (or timbres) at the same time; for example, one that could play a drum sound, a bass and a piano.

QUANTIZE: The process of finely altering the timing of individual notes, perhaps because they have been inaccurately entered 'live', to bring them in line with the overall beat of the music.

SEQUENCER: A piece of software on a computer (or sometimes built into a keyboard) which stores musical scores and transmits this information in real time via MIDI to synthesisers which will then play it. Some sequencers have the facility to receive and memorise MIDI information from a keyboard so music can be entered 'live' instead of note by note.

SMPTE: Society of Motion Picture and Television Engineers – this is a time coding used to synchronise audio or video tape with MIDI signals.

you left it on. A typical single keyboard – the self-accompanying variety from Yamaha and Casio – will transmit on only one channel, usually variable. However they will often receive and play on up to 8 channels simultaneously and with other surprising attributes.

Mode

Not terribly important now. Early on it was thought that various modes of playing MIDI instruments would be useful. Not so. Although there are 4 ways in which MIDI data can be dealt with relating to either one note or many notes at a time and one channel or all channels playing the same notes, most if not all instruments use mode 3. This means that it will play lots of notes and listen to the MIDI channels individually.

Note Number

You could have more notes in your module than you bargained for as the note number tells you how wide a range of notes your instrument can play, regardless of the length of the keyboard. Every note is given a number; lowest is 0 and highest 127, which is virtually 10 octaves – a piano only has 7. Our example reads all the notes but then in the next line says 'True Voice 12 – 108'. This is a guide to the actual range of the sound chip. It will only create pitches within that range.

Notes it recognises and that fall outside the range are 'wrapped round'. That is to say, it will repeat the upper or lower octave again.

For example, if note number 12 came in followed by notes numbered 1 then 0, you would actually hear note 12, then notes 11 and 12 again, the 1 and 0 triggering off notes an octave higher than they really should be because the chip is incapable of playing that low.

Velocity

Velocity is another important area for keyboard owners to check out. Our example shows that the module does respond to velocity – how hard you hit the keys. This is always noted against Note On and often gives you the range it will respond to; typically 1-127. With low-budget keyboards it is often the case that the transmission side will say 'O v=64'. This means that the velocity it sends out is fixed; it does not have a touch sensitive keyboard. However, often the internal sound chip does respond and this data can be varied in many sequencing programs to add to the variety and depth of the sound.

The Note Off is invariably 'X 9n v=0'. It ignores the MIDI code that says note off but rather pulls the velocity down to 0, thus effectively muting the note and reducing the danger of a note 'hanging'.

A point to bear in mind is that both Velocity and Aftertouch are parameters that are set up in the actual voice data. For example, a Trombone usually responds to Velocity and, where possible, Aftertouch. But a voice such as a Church Organ or Bagpipes would respond to neither of these as it has no need to even if the specs say the sound chip is capable of doing so; the genuine article has no expressive variation of volume and so neither will the synth version.

Aftertouch

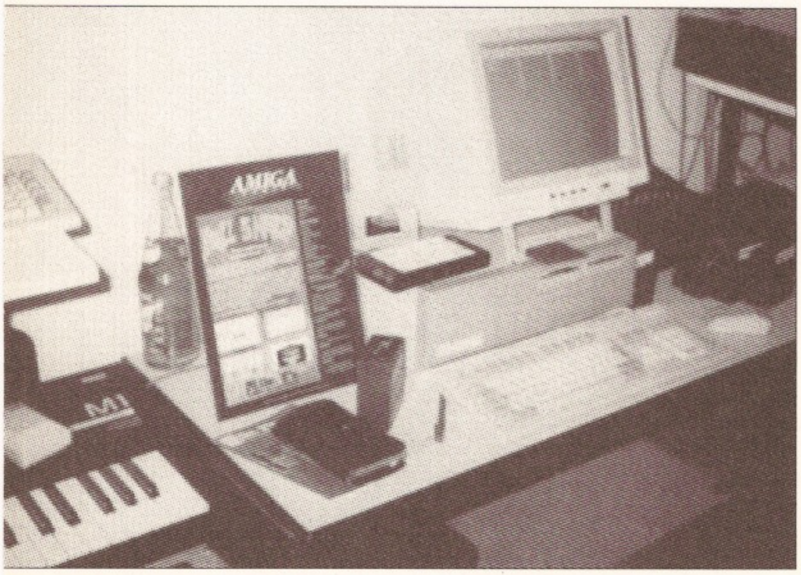
If yours does this, it's an extra bonus. Aftertouch is the pressure applied to the keys after the note has been played but before it is released. It can do all sorts of things to the sound; make it change in tone, pitch, add vibrato and is the current favourite among sound programmers working on screaming heavy metal guitar sounds. As you will see, there are two sorts. Key Aftertouch is the expensive variety where each individual key has its very own aftertouch data tagged to it – good for bringing out individual notes inside a chord. Channel Aftertouch is the norm for most instruments, a facility by which the aftertouch effect is sent to all notes working on that

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seeing the 1.1 version in the UK 'very soon', as they say, and at a price competitive to *Music X*, things could prove interesting. By no stretch of the imagination is it a re-write of the well known ST version, more of a re-think.

It will run on an A500, although you might be stuck for memory space. As well as all the professional features of editing, looping and recording, it has the graphic grid editor, graphic control of parameters, a drum editor, score display, midi echo and complete mix-down features. Tempo and time signature changes are programmable and it will also work with SMPTE and export up to 4 extra MIDI chains, bringing the total number of channels available to the user to 80.



Plenty of musical applications for the Amiga are demonstrated and, for some, there's the opportunity to get 'hands-on' previews of new gadgets.

Also having its first outing was Dr T's *KCS* 3.5 which now has the more friendly name of *Omega*. *KCS* has undergone many upgrades and this is the latest. A top-of-the-range package, it has 48-track recording and 126 specified sequences which can be ordered in up to 16 songs. The editing is either graphic or data-event and there is a score printing facility as well. Not only does it allow you to control the notes but its graphic editing features extend to control MIDI parameters such as tempo, velocity, volume etc; these features are an enhancement of those seen on *Tiger Cub*. Provisions are also included to control the Fostex *R-8* multi-track recorder via MIDI and it can work with SMPTE and MTC codes for use with external devices, such as multi-track recorders and video. An auto-mix window with graphic faders is also present. In effect, *Omega* is a culmination of all the features currently available on the Dr T sequencers and present owners can upgrade to this top-of-the-range package.

Amiga Education

The most revolutionary program of the show (for my money) was the teaching program, *Composer Quest*. This is in its final development stages by Dr T and offers a revolutionary, interactive and altogether fun way for a student at school to learn not only about the history of music and composers of different types of music – jazz, rock and classical – but also it fills in the social, world and art history as a contemporary background for each era and composer. It can be used as either an educational game or a learning application and if the concepts of those boring school programs (a la BBC) leap to mind, forget it. This one is real fun.

By spectacular use of the graphic and sample playback abilities of the Amiga you can not only click on a photograph of the composer but hear simultaneous sampled excerpts from

MIDI channel. Again, it doesn't matter if the keyboard can't transmit this data, if the chip responds you can add it in the sequencer.

Pitch Bender

We all know what a Pitch Bender looks like. It's either a wheel or joystick that bends the note up or down. Even if your instrument hasn't got one (therefore no transmission) you may find that the chip will perform this function. Quite often there is extra information given, like '0 –12 semi', which means that when at full stretch it sends an octave's worth of pitch bend data up or down. The Remarks column may say something like '7-bit resolution'. This means that the data is quite detailed in respect to each small shift in pitch. 5-bit resolution usually means you can hear the sound make small steps up or down as you bend. Again, the amount the sound is shifted is dependent on how it is programmed in the first place and often the Pitch-bend range of the sound is only two or three semi-tones; it reads in a full octave of Pitch-bend data but scales it down accordingly.

Control Change

Check the control changes to see what other tricks your instrument can perform. There are 127 control change numbers and these refer to parameters that are common to most synths that in some way affect the sound. Every M.I.C. I have seen always tells you exactly what these controls will be, so if you line up the charts of your equipment side by side you can see at a glance just what common ground they have between them. The most common are:
1 – Modulation. This will probably add some sort of Vibrato to the sound depending on the programming
7 – Volume. Essential for multi-timbral modules as by setting this from the sequencer you set up the balance of the sounds. Otherwise it is an impossible task.
10 – Pan. WIth a stereo output, it positions the sound between the left and right audio channels.
64 – Hold. Usually refers to a sustain but it's often handy to put this in a sequence to give the effect of, say, a big piano chord.

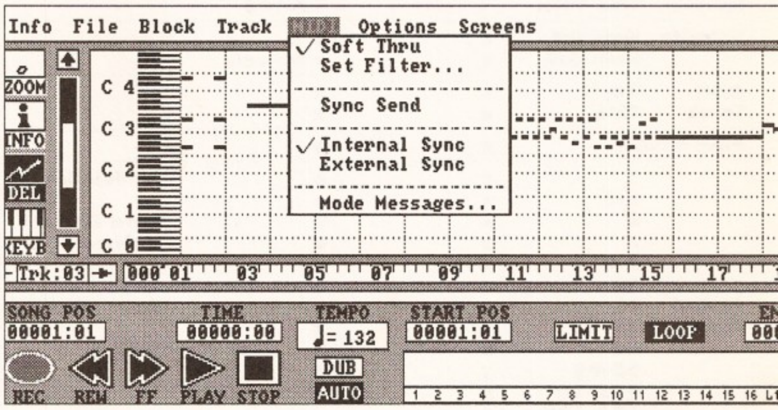
All these numbers will be followed by one or, in some cases, two more numbers referring to the status; on/off or the distance between its extremes. Our example has several more controls but suffice to say that Data Entry can mean anything that the manufacturer wants, as does RPN (Registered Parameter Number). Expression is usually transmitted by Organs as the foot pedal volume and Reset All controllers fixes everything back to it's power up state. If you have some unusual ones most MIDI handbooks or sequencer literature will guide you as to their use.

Program Change

You will need to check the program change function out to find how many voices/sounds your instrument has really got as the information shows the module's ability to change sounds separately on each channel. Sometimes there are many more sounds in the instrument that you can actually access from the front panel. Our chart shows that the RA-50 has 128 sounds that respond correctly from numbers 0 – 127. If yours has less than this number it will have a 'True #' that follows the same 'wrap round' logic as the true note numbers. Some instruments miss out certain numbers and use numbers of more than 100 to access different banks of sounds.

The very latest synths and modules use Control Number 0, followed by another to find soundbanks and Program Change, then they will find the sound inside the sound bank. This facility makes for a very versatile sequencer-synthesiser set up.

However, a quick cautionary note (pun slightly intended). Some multi-timbral models have used Program Change to flip between multiple set-ups. This should be noted in the Remarks column.



The facility to alter the way your sequencer deals with MIDI information can help you extract bags more sound from your synthesiser modules.

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relevant works with CD quality while reading text. Clicking on other icons displays information and pictures about social and art history of the period. The advisors for the program include some heavyweight academics from Harvard. An additional feature is that text can be altered and tailored to particular grade work. The game section plays a mystery tune which the player has to put into an era within a certain time limit. The player travels through time, picking up other significant points and hints en route, from the cockpit of the 'Gizmatron'(!). It requires at least 2Mb and a hard disk to run this application; release is planned for CDTV as well.

Going for a Song

There has been an increase of interest in the UK recently in pre-recorded songs in MIDI format on floppy disk. The idea is that you purchase a selection of tunes on disk that will fire up your multi-timbral synth having first been loaded into a suitable sequencing program; one that will read MIDI file format. If the Fair was anything to go by, this is a trend that is set to explode as virtually every stand seemed to have some sort of MIDI music catalogue as well as specialists in this field; this also spills over into educational programs that teach you how to play bass, slap bass and blues, for example; some schools in Germany have already been using these. Amiga files feature quite highly in the catalogues both in Germany and the USA. Expect a task force-type invasion soon.

New Midi Standard

By way of supporting a new MIDI standard, there is a new level of MIDI, shortly to be announced, called General MIDI Mode; details of this were revealed at the Fair and the new standard is expected to be quickly ratified by the Japanese and American MIDI associations, probably by the time you read this in fact.

The plan is very relevant to the concept of MIDI song files. At present, if you buy a song file there is no guarantee that the sounds constituting the song will match up to those in your synth as there is no way at present that the MIDI code can call up sounds by name – it can only do it by number and there is no agreed standard as to which number matches what sound. In other words, you may find that the program number (sound) present on the song file for, say, that heavy bass line actually calls up a pan flute; your synth not matching that which was used when the MIDI file was written. Other problems can arise in that there is no agreed standard MIDI channel for the drums or indeed any agreement on what note number corresponds to what drum; the solid bass drum on the file could be routed to a triangle on your equipment.

General MIDI Mode is an attempt to remove all this as until now the user had to take a fair amount of time and trouble to change MIDI channels, program change numbers, volume, velocity and pan settings not to



Kawai, and every other synth manufacturer worth its salt, appears every year with a new crop of instruments by which to wreck your savings.

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MIDI Implementation Chart

Function		Transmitted	Recognized	Remarks
Basic Channel	Default Changed	x x	2-10 x	
Mode	Default Messages Altered	x x *********	Mode 3 x	
Note Number	 True Voice	x *********	0-127 12-108	
Velocity	Note ON Note OFF	x x	o x 9n v=0	
After Touch	Key's Ch's	x x	x x	
Pitch Bender		x	o	
Control change	1 2-5 6 7 6-9 10 11 12-63 64 65-99 100-101 102-120 121	x x x x x x x x x x x x x	o x o o x o o x o x o x o	Modulation Data Entry *1 Volume Pan Expression Hold 1 RPN LSB, MSB *1 Reset All Controllers
Prog Change	 True #	x *********	o 0-127 0-127	
System Exclusive		x	o	One Way Only
System Common	Song Pos Song Sel Tune	x x x	x x x	
System Real Time	Clock Commands	x x	x x	
Aux Message	Local ON/OFF All Notes OFF Active Sense Reset	x x x x	x x (123-127) x x	
Notes	*1 RPN = Resistered Parameter Number RPN 0 (00H 00H) = Pitch Bend Sensitivity Data entry sets the value of this parameter			

MIC for the Roland's RA-50 sequencer section. The sound module is that of the MT-32. Note the O and X throughout the chart means Yes and No.

System Exclusive

System Exclusive transferral of data is handy, but only essential if you need to save the memory of your instrument. This section sends and receives voice data and anything else that is peculiar to that make and model – micro tuning, drum patterns and so on. If your synth can do this then you can dump out the sounds and put them back in.

Most sequencers can record this data as part of a sequence, but you would need to find out what the commands are or buttons you have to press to do this with your particular set up. A very good case for delving into those lonely instruction manuals.

System Common

Relevant mainly for drum machines that have a song assembly facility or for sequencers that need to line up bar by bar with other devices. Song Position sends bar and beat information and the sequencers sync to this. Song Select and Tune are hardly ever used.

System Real Time

Clock is important if you have a drum machine or sequencer. Most software will either run on its own internal clock or respond to another. The Commands are simply Stop, Start and Continue. You should be able to receive and transmit this data but you may need to delve into the manual to find out how to switch it on and off.

Aux Messages

Local on/off is not often used. It disconnects the keyboard from its sound generating chip for use as a master keyboard in a MIDI set-up. 'All notes off' is usually only received unless it is a sequencing device; it turns every note off (Oh what a surprise that is).

Active Sensing is usually found on instruments designed for live use; unless they get a little message every few milliseconds to say everything is OK they switch off and Reset is not usually implemented.

Better buys

Now you've studied this information you should be in a position to read through your synthesiser's MIC for an instant MIDI profile.

When applied to possible future purchases, this information should enable you to compare different synths and see which one is right for your purposes. Also, now you know the relevant sections to look at, you should be able to get more from the gear you have, which means much more creativity.

After all, the whole point of these little black boxes is not about specification but inspiration. AS

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mention aftertouch. For an instrument to conform to this new standard it must be able to play 16 notes simultaneously, 16 drum sounds simultaneously, support 16 MIDI channels, percussion should be on Channel 10 and it should have 128 preset sounds. These sounds are to be grouped in a certain way, which pretty well corresponds to the way Roland has laid out sounds in the *MT-32* and its latest module, the *Sound Canvas*. The General MIDI Voice Definition Table will ensure that song files, for example, will play the right voices on any tone module or multi-timbral synth regardless of make, although, of course, the quality may differ. General preset number 1 will be Acoustic Piano, 36 Fretless Bass and so on. Aspects of the sound, like touch sensitivity, pitch bend and vibrato, will also be standardised. Of course, all this will only apply to preset sounds – those permanently locked into the ROM of the instrument. How other sounds are organised is something that this standard could not hope to cover. Roland is also proposing that there should be subgroups behind the main 128 sounds that could be accessed by the use of the recently added MIDI Bank Change command (control number 0), which will dive into the depths of the ROM and pull out finer definitions of the sound required. However this refinement is not agreed on as yet by all manufacturers and may end up being unique to Roland.

As this voice standardisation gathers momentum it can only mean that sales of song disks for sequencers will increase enormously, as the laborious process of fiddling around with the data to tailor it to your set-up is removed. It may take a year or two for both the song files and equipment to catch up, but when they do the advertising war will start in earnest. Since some state-of-the-art software already offers these files on CD-ROM it doesn't take much to see these crossing over to the Amiga, which should put paid to the £7000+ outlay required for Karaoke AS

CHECKOUT

Launches: 15/20
Probably the highest concentration of new programs and hardware under one set of roofs, although you have to walk your socks off to get round it all.

Bargains: 5/20
It's not really a box shifters' market stall show but you could get one or two deals from the smaller exhibitors. Curiously, software is cheaper in Germany than it is in the UK.

Venue: 18/20
Monstrously large but smart and clean, with moving walkways and escalators to take you from area to area. Very easy to find as it is copiously signposted at every opportunity and served by all public transport with special airport buses running every 15 minutes.

Facilities: 18/20
With Teutonic efficiency, there is everything you could want within easy reach. Loos have attendants and are clinically spotless, there are permanent food and beer stalls in every hall and a restaurant immediately outside each hall. Prices aren't exactly wonderful, with the cheapest (you guessed it) Frankfurter being about £1.50 and drinks are quite pricy. To get there could cost you as little as £79 return from Gatwick and about £130 from most other airports.

Stands: 18/20
With all the major music companies displaying their wares, the general appearance is very slick and often novel. This is in keeping with the place itself, which is smart and modern but manages to retain some character.

Overall: 74/100
As an eye-opener to the current trends in music soft and hardware it is excellent. Although not cheap to get to, compared with home-grown exhibitions, it would be ideal for the average punter who could combine it with a holiday of sorts. For the retailer, specialist or just plain fanatic it is fairly essential.

BEGINNERS START HERE

A spreadsheet is just an electronic version of the blank planning charts businessmen have been using for years. Typical uses include cashflows, profit and loss accounts. Spreadsheets have several advantages over their paper cousins: they are much faster, help eliminate (some) errors, and are much more flexible. Modern spreadsheets – such as *Advantage* – have evolved from the basic row-by-column calculation of their ancestors and often include database and even word-processing facilities.

Figure 1 demonstrates how all spreadsheets are laid out. The result is a sheet covered in little boxes, known as cells. Some spreadsheets display the rulings – the grid – by default, others do not. Either way, the techniques are the same.

Every single cell on the sheet has a unique row/column address – called a cell reference. Traditionally, rows are shown as numbers and columns as letters. This is shown in Figure 2. The idea of cells is something many people find a little alien when they first start using a spreadsheet, even if they have spent most of their lives using a similar paper-based system.

Take a typical case from a cashflow forecast – cliched certainly, but relevant nevertheless. Imagine for a moment you ran a small news agency. Each month you have a certain number of takings from papers, magazines, cigarettes, sweets, cards and so on. Similarly, you have expenses – some fixed and some variable.

The essence of good cashflow is predicting how those trends will affect the bank balance at the end of each trading month, quarter (for VAT) and year. The idea being, you predict what you expect to

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Down To Business



MARK SMIDDY casts a critical eye over Gold Disk's acclaimed Advantage *spreadsheet*

When it comes to spreadsheets for the Amiga, *Advantage* is reckoned to be the cream of the crop and, without saying any more, I shall break the first law of reviewing by agreeing. Not perfect – but still the best of the bunch. The design is beautiful yet functional, the layout intuitive, and the interface easy to get on with.

Version 1 was withdrawn soon after it appeared because of a bug, I understand. This was quickly corrected, a load of new features added and the product re-released in its 1.1 incarnation. It's just a pity the same cannot be said of many other software products. For those already familiar with *Advantage* 1.0, see the panel below for a list of some of the new features and changes. Those who haven't seen it yet, start here.

Advantage is the first people friendly spreadsheet I have ever seen – and believe me folks, I've seen a lot. Lovers of the slash commands employed in PC-based sheets like *Lotus* can forget this one because it uses WIMPs to the full. Nevertheless, quick-key shortcuts are still dish of the day – and although many appear on the menus, some functions have extended meanings when accessed via the keyboard.

Good behaviour

Thankfully though, *Advantage* programmer Michal Todorovic has been thoughtful enough to stick to standard Amiga guidelines – so the program behaves as expected with editing combinations such as A+X and A+V. Selecting a range of cells is a simple matter of dragging a rubber band around the ones you want to work with. Shift-clicking works as it would on the Workbench (or the Mac for that matter) and instantly selects a range. Though this feature is not always predictable at first, you soon get used to it.

Ease of use and instant appeal are predominant throughout the interface. Requesters are indicated. by ellipses (...) and sub-menus by

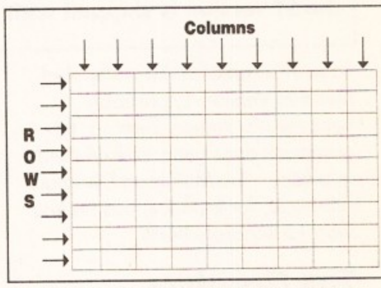


FIG. 1. Typical spreadsheet layout showing rows and columns

Ringing in the changes: the Advantage 1.1 Upgrade

The 68881 and 68882 (floating point co-processors or FPUs) are now supported. This should result in an increase in re-calc speed on larger spreadsheets. In itself, this is a bonus for *Advantage* because it is the only Amiga spreadsheet I have come across to offer this sort of support. Currently, only the Amiga 3000 series is fitted with FPUs as standard.

Accuracy has been improved. *Advantage* now calculates internally up to 18 digits of precision and displays 13. Despite this, the programmer claims a significant increase in speed over the old engine – from 5 to 40 per cent. Also, the file format has been honed resulting in a claimed increase in loading speed of more than 80 per cent (30 per cent from floppy).

New menu options include an alias for cells, so any cell – or range of cells – can be assigned its own name. This allows you to traverse large sheets easily by assigning meaningful names to areas of the sheet.

Gold Disk's Transcript word processor is now supported. This allows users to attach extended cell notes to cells. When the cell is double-clicked, Transcript loads the file and its window is forced to the front, similar to the memo-edit function found in *dBase* III clones, but takes in the power of multi-tasking. The option requires at least 1Mb RAM, preferably more. Transcript (or Transwrite) is a separate word processing program also by Gold Disk.

Support for *Lotus* 1-2-3 has been improved, with the total functions now 126. File formats for version 1, 1a, 2 and 2.2 are supported, plus Symphony. Macro files and the following aren't included: ATAN2, CELLPOINTER, VLOOKUP, HLOOKUP, CELL, @, ISAAP, ISAAF.

ARexx scripts, macros and graphing information are now stored alongside the sheet and loaded automatically. ARexx support includes four more functions. Also, a new command has been added to access data from disk-based spreadsheets – saving memory. Macros and ARexx scripts can be replayed automatically when the sheet loads up. ARexx is not supplied with Advantage. It does come with Workbench 2. 1.3 users can buy it separately.

Graphics have been improved. Area charts can now be stacked and 3D pie charts can be exploded. The save to IFF option has been altered so it does not require large amounts of CHIP memory.

The small version of *Advantage* (for the A500) has been replaced by two separate modules: Calc and Graph. Calc is the complete spreadsheet without graphics; Graph contains the graph drawing features.

Phew, all this for a bug fix! Registered users should have received their upgrades by now. If you haven't registered your copy, do so now or you won't get to hear about the bugs.

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WHAT HAPPENED TO K-SPREAD 4?

We promised you a review of *K-Spread* 4 and we brought you *Advantage*. Why? Those who read the first part of this series will have noticed I promised to cover only those products I would trust in my business. On the surface, *K-Spread* 4 is just such a product. Underneath, quite a different story starts to emerge.

***Spread* 4, like its predecessors, was developed on the ST and ported to the Amiga. Nothing wrong in that – if you can put up with a gaudy simulated GEM interface and garish colour scheme. After turning up late, things started to go downhill.**

When it did finally arrive, bits of the manual had been punched in the wrong places and some pages were out of order. But to err is human so I can forgive Kuma for that slight mishap. Serious bugs simply cannot be overlooked and *K-Spread* 4 has several. I spent the best part of two days trying to discover what made it Guru incessantly.

The obvious answer is a stack problem. surely they would not overlook that one? Someone did. According to the programmer, the ST version is shipped with a 20K stack and the Amiga is very stack-thirsty at the best of times. Setting a 30K stack helped – at least it stopped the endless crashing. That problem is easily remedied from the Workbench.

So, undaunted, off I went again, battling bravely against the recalcitrant auto-recalc, devilish directory selection and a distinctly unfriendly user interface.

After wasting five days and countless hours on the phone to the programmer, I threw in the towel. I will review *K-Spread* 4 in a future issue on two provisions:

1: Kuma fixes all of the major bugs.

2: Someone writes a decent manual that refers to the Amiga.

Until then it will be relegated at the back of a disk filing cabinet, so for this month I've left you to enjoy reading about *Advantage*, a spreadsheet that does work.

To this end, I am indebted to HB Marketing, which stepped in and supplied Gold Disk's *Advantage* at a moment's notice. One frantic phone call, just after five o'clock in the afternoon, resulted in the package arriving in the first post next day.

>>>. This replaces the >> symbol found in Version 1, probably because it's clearer. Even so, this approach does get a little unwieldy in places – the Maximum Decimals sub-menu, for instance, has no less than 15 separate items.

The Graphics

Using Advantage is sheer delight. If there is such a thing as business leisureware, then this surely must be it. Drawing graphs of data is so easy that it soon becomes second nature – simply select a range, ask for a chart and bingo! Unique in my experience, *Advantage* pops up a requester with pictures showing the available chart types; just select the one you want. This is followed by another requester of chart preferences – specific to each type – so making an exploding 3D pie is a doddle.

On the down side, it is not yet possible to use fixed scales on charts, or some of the fancier features normally found in packages such as this one – log scales and so on. Also, because *Advantage* works out the data sets for you, it is not possible to superimpose two different chart types or two data sets. These are two features I would like to see added for a future release – Gold Disk take note. To be fair, these are generally only useful for some scientific applications, but who's to say who might use the package some day? They may also like to look at including Gannt charts (used in project planning) and found in *Superplan* the power spreadsheet from Precision Software.

Taking stock

So, I hear you ask, are there any disadvantages to *Advantage*? Well on the face of it, no, but the spreadsheet world is in constant flux and just when you think it's safe to say "enough", some clever dick comes up with something better. Kuma claims *K-Spread* 4 has enough graphics, even though it is limited to bar, line and area charts, but I would argue that if people don't need pie charts, scattergrams, Hi-Lo charts and so on, then why were they invented? One competitor from the PC world, weighing in at 50 quid, includes Radar charts (whatever they are).

ARexx wrangle

On a more specific issue, functions such as Fill Range should really be included somewhere without having to resort to ARexx programs. Although this does prove the worth of an ARexx interface beyond doubt, most of us have to lash out more hard-earned moolah to get it. Similarly, the database function is

happen and recalculate the sheet at the end of each period with the real figures. This shows how accurate your forecast was.

The example cashflow shown in Figure 3 was drawn up to illustrate a typical hand-written version. As you can see there are a lot of figures and this greatly simplified version only covers six months. Just imagine making one simple mistake in the calculation. Not only is it difficult to spot, it affects the rest of the sheet too. In other words, tracking and maintaining a manual cashflow is a nightmare.

Spreadsheets remove all the hassle and they are much easier to update. For instance, this theoretical example assumes after the budget, cigarettes and tobacco have received their usual hammering. This reflects on the cost of stock and profit margin on the items concerned. And when the price goes up, people buy less. But what if petrol rises sharply as well? Worse still, what if the landlord puts up the rent?

None of these problems concern a spreadsheet because all you have to do is correct the offending figure and the sheet does the rest. Adding extra items or deleting others is a real breeze and, at the end of the day, because a picture tells a thousand words, producing a graph of the results is simplicity itself.

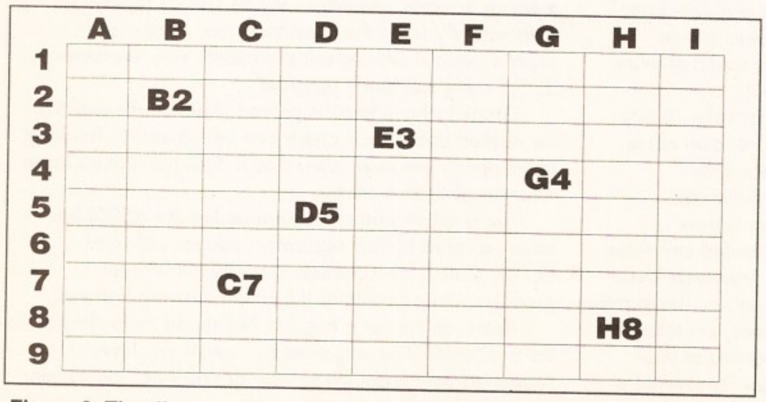


Figure 2. The diagram shows the way in which spreadsheets are drawn up. Note each cell has a unique address, given as a letter and a number.

STILL GRAPPLING WITH AREXX?

I'm well aware that many of you will go out and buy *Advantage*, get completely lost and turn to *Amiga Shopper* for help. Not to worry. If I can persuade HBM or Gold Disk to part with a copy (hint hint), I'll be running a full tutorial on the beasty in the months to come. In the meantime, the thing most likely to cause hassle in the early days of using *Advantage* is ARexx.

Since Commodore is bundling ARexx with Workbench 2, a lot of people are going to be using it, and *Advantage* is a typical ARexx controllable example. Remember though, you must activate RexxMast or ARexx will not be running. The simplest way to do this is drop it in the Auto drawer on Workbench 2 or start it from the Startup-sequence – it doesn't use much RAM.

LOTUS IS STILL TOP DOG – EASY AS 1-2-3

In the PC world the great grandaddy of them all (at least the first package to gain a wide following) is *Lotus* 1-2-3. *Lotus* has many imitators, many of which claim to be better specified and faster, yet it still retains the top slot as the industry standard. Therefore, at least some level of *Lotus* file compatibility is of major importance to any spreadsheet – even those on the Amiga. Nevertheless this is not always as simple as it may at first appear.

For openers, *Lotus* – understandably – is not very forthcoming about the intricacies of its file format. Certainly, the basics are fairly well known, but many of the finer points are not. This leads to a certain amount of incompatibility, but in the end it is the clone-makers that suffer.

Just to exacerbate the situation still further, *Lotus* has a feature called Add-Ins. This allows third-party programmers to add features to 1-2-3, yet retain full compatibility with existing spreadsheets. Unlike macros or user functions, Add-Ins are not interpreted by 1-2-3. Instead they access the spreadsheet engine directly. Being programs in their own right – which use 1-2-3 as an operating system – they are not compatible with other software. Even if Amiga software (for instance) could ape the spreadsheet's system calls, the Add-Ins will still not run on different processors.

Setting up any spreadsheet requires a small amount of programming, but this is not usually a major problem once you get the hang of them. I'll be featuring more on this later in the series. Typically, for a cashflow you'll just need to add up lots of columns. In Advantage this feature is simply =SUM(Starting cell:Finishing cell). Where the start and finish numbers are just simple cell references, so =SUM(B2:B6) would add the cells B2, B3, B4 B5 and B6.

This is where spreadsheets come into their own, because the value produced by that formula can be used elsewhere in the sheet simply by accessing the appropriate cell – that is, the one containing the formula. In a cashflow, you have to perform the same calculation for every column so that when you copy the cell, the relative references are changed automatically. Therefore B8 contained =SUM(B2:B6) and you copied it to C8, C8 would read =SUM(C2:C6) and so on.

There you go, not all that difficult at all, huh?

	January	February	March	April	May	June
Income						
NEWS	1500	1500	1500	1600	1600	1600
Mags	1200	1200	1300	1300	1300	1300
Sweets	200	200	200	200	220	220
Fags	2500	2500	2500	2500	2900	2900
Others	100	100	100	100	100	100
Total	5500	5500	5600	5700	6120	6120
Expenses						
Rent	800	800	800	800	800	800
Htg, Lgt etc	50	60	65	55	50	45
Wages	500	500	500	500	500	500
Stock	3000	3000	3000	3000	4000	4000
Petrol	40	40	45	45	45	45
Phone	70	65	70	70	70	75
Pro. Fees	250	–	–	–	–	–
Loan ACC	125	125	125	125	125	125
Total	4835	4590	4605	4595	5590	5590
Balance	665	910	995	1105	530	530
Bank Acc						

Figure 3. A typical handwritten spreadsheet might include the items given above. It's plain to see it would be a nightmare to update manually.

adequate, but not as flash as it could be. Then again, Spreadsheets do not tend to make good databases; that's what databases are for.

Overall though, I have yet to see a spreadsheet that is better, more stable, easier to use, or as downright good as *Advantage*. I said that before when I reviewed Version 1 and I feel there is every reason to stick to it now.

What it lacks in features – and many useful features are still missing – it more than makes up for in every other way. Kuma, and quite a few other spreadsheet developers, could do a lot worse than sit up and take notice of Gold Disk's style of less flash, more panache.

Very few people will be at all disappointed with the host of excellent features on offer in *Advantage* and, at such a good price, this is definitely still the package to go for. Nice one Gold Disk, the advantage is still yours. **AS**

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CHECKOUT

Functions...............21/25
Enough to perform most of the tasks you would ask of it, but a few more features would be nice for seriously heavy use.

Ease of Use 22/25
It is probably the most accessible spreadsheet yet devised.

Speed......................8/10
Hardly blinding, but nevertheless it's still very impressive.

Interface.................9/10
Some day, every application will be designed this way

Documentation 5/15
The documentation is clear, but far too concise. A little more in-depth information would not go amiss.

Price......................10/15
Advantage is right at the top-end of the price bracket, but then you get an awful lot for your money.

Overall................75/100
A true 'everyman's' spreadsheet. As you've probably gathered, in my view *Advantage* is Amiga software worthy of very high praise indeed.

General queries on the Rexx should be sent to my bearded chum, Jeff Walker. He's a nice guy and loves a challenge.

Right then, the examples on the *Advantage* Examples disk are as follows:

- **Months: insert three letter month names into a sheet.**
- **Swap: Swap columns in a range.**
- **Table: Create a table of values.**
- **Replace: Search for a string and replace it with another.**

The first two are a real doddle. Simply select a range for them to work with and execute them from inside *Advantage*. Table and Replace are straightforward but they need to be run from the CLI. Eegadds, did I say this was friendly?

- **First select a work area (a range of cells) with the mouse.**
- **Now move the *Advantage* window well out of the way and it's time to open a Shell.**
- **Set the directory to the Rexx directory, which you will find on the *Advantage* Examples' disk.**
- **Now enter the following at the prompt:**

```
RX TABLE 200 1
```

Flip back to *Advantage* and you can see the range getting filled with values before your very eyes. Replace works in much the same way, but this takes text values. To see this in action, load up the Graph.ADV spreadsheet from the Examples disk, highlight B1 to H1 and type the following:

```
RX REPLACE Label Point
```

If all this seems like gobbledygook or goblinspeak, then you should study the *Amiga Shopper* series on AmigaDOS, now showing on pages 81-83.

commodore

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The Best of Both Worlds

Paul Overaa describes how to jump from C to machine code and back

BEGINNERS START HERE

You only have to pick up an official Amiga reference manual to see how important C is to the Amiga programmer. Why is this so? It's because large amounts of the Amiga's operating system software were written using C and this dependence has spilled over to the technical documentation.

Why was C chosen? The underlying reason is simple – C is an absolutely brilliant language. It is small, so it's relatively easy to learn. It is a compiled language that produces fast-running code. It is very well suited to modular (that is to say, stage-by-stage) development and it supports the separate compilation of individual modules.

C offers facilities for using complex variables, called structures, which provide a powerful way of grouping and accessing sets of related items in a single unit. C also supports recursion and has incredible multi-level indirection pointer facilities (see Amiga Answers).

Programs written in C can be very portable – that is easily moved from one machine/operating system to another. That said, just because you write a program using C as the language does not necessarily mean that the program will then be portable. To write portable C code, you must take care to minimise the use of and isolate the areas of a program that may be machine/OS dependent.

C, on the Amiga at least, is unfortunately quite an expensive language. Even so, the two most

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To be able to write mixed code you need to know how to get from C to assembler and back again. The good news is that once you have seen it done, you will realise that it is not as difficult as it may at first seem.

All the necessary mechanical details are provided in your C compiler manuals, but the explanations are usually written in a way that only really make sense once you know a little about what on Earth is going on in the first place.

This article is designed to do three things: first, to provide the necessary background information so that the accounts you'll read about in your compiler manuals will make more sense. Second, to provide some details of the conventions used with the two most popular Amiga C compilers, *Aztec* and *SAS/C*. Third, to give you a couple of short examples which will get you into mixed code programming in as painless a manner as possible.

For the moment, however, let's make a start by talking a bit about the magic that happens when you place a call to an assembler routine – Convert(), for example – into a C source program.

References

The compiler uses such source code statements to generate a reference to the named routine.

Under normal circumstances both the *Aztec* and *SAS/C* compilers tag on an initial underscore to the function name. The call to the function Convert() therefore has the linker searching for a routine called _Convert. And it is this routine, if the linker is going to successfully resolve the reference, that must be provided in the assembly language module.

The code that various C compilers produce when they encounter a function call does vary, but the conventions to be followed will always be detailed in the compiler manual.

To start with, all you need to be aware of is that the end result is usually that any parameters present in the function call get pushed on to the stack prior to a call being made to the appropriate subroutine. I say 'usually' because there are some qualifying conditions with *SAS/C* which allow register arguments to be used rather than the stack, and in this case it is an @ character rather than an underscore that gets placed at the start of the function name.

Writing the C code is easy. It merely involves placing suitably named functions calls, with any required parameters, into the C source. This is done using normal C function conventions – you can even add your own ANSI C function prototypes to ensure the compiler makes the appropriate usage and parameter-type checks.

The next step involves writing suitable assembly language code and assembling it to produce linkable object code. A couple of assembler directives – XDEF and XREF – have to be used to get things running nice and smoothly.

XDEF and XREF

XDEF is an assembler directive used to define assembly language labels as being visible to other modules at link time. If you forget it the assembly stage will go OK but you'll get errors when linking because the linker will be unable to resolve the corresponding function reference in the C code module.

XREF goes the other way – it tells the assembler that the information needed about the item in question will be imported when the assembly language module is linked. If you forget this you will get errors as soon as you try to assemble your code because the assembler will not realise that labels have been used whose values are unknown when it comes to assembly time.

Most assemblers place a limit on the number of characters within a label that will be regarded as significant. The ANSI C compiler standard requires that the compiler caters for six characters with external references, although most handle more. Either check first, or don't use long names for functions and variables whose references might need to be passed between modules.

Aztec C offers #asm and #endasm statements to allow assembler code to be embedded within the C source. This can be useful on occasions, but in general it

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JARGON BUSTING

ARGUMENT: General name for a value supplied to a C function. Also referred to as a parameter.
DIRECTIVE: A statement which instructs an assembler or compiler to do something as opposed to compile or assemble something.
EMBEDDED CODE: Assembler instructions which have been written within the C source code.
EXTERNAL REFERENCE: A reference to a variable or function declared in another module.
FUNCTION: The C language name for a subroutine.
GLOBAL VARIABLE: A variable which can be accessed and altered from anywhere within the program.
LABEL: A name used to identify a particular position within a program.
LONGWORD: A byte is 8 bits, a word is 16 bits, and a long word is 32 bits (the equivalent of four bytes).
MODULE: An isolated program or piece of code, not part of the main source code file, which usually does a specific job.
NON-SCRATCH REGISTER: A processor register which must be preserved from alteration.
NULL: Symbolic name for a zero value.
PARAMETER: Commonly used alternative name for an argument. (No it isn't. Yes it is. Look, do you want a parameter about it!)
POP: Retrieve a value from a stack.
PROCESSOR REGISTER: A data storage area inside a microprocessor.
PUSH: Store a value on a stack.
RETURN ADDRESS: The address in memory at which program execution continues after a function has been exited.
RETURN VALUE: A value which a function gives back to the program that called it. Also referred to as returned object.
RETURNED OBJECT: see above.
SCRATCH REGISTER: A processor register whose contents do not have to be preserved.
STACK: In general... a last in, first out (LIFO) data structure. In the context of this article the term refers to an area of memory used by the processor to store and retrieve values in LIFO order.
STACK FRAME POINTER: A pointer to, or in other words the address of, a stack work area.
STACK WORK AREA: A area of memory set aside on the stack, usually on a temporary basis, for things like intermediate calculations.
STATIC WORK AREA: A fixed area of memory which is available to the program throughout the whole time it is running.
STRUCTURE: A complex variable supported by the C language.
UNION: Another type of complex C variable which can store different types of object at different times.

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popular C compilers for the Amiga really offer excellent value for money. *SAS/Lattice* and Manx's *Aztec C* are both well-thought-of and offer far more than just compilers. You get a complete programming environment, which includes a compiler, editor, assembler, debugger, large libraries of pre-written routines and, most importantly, good documentation and on-going product support.

A welcome development is the appearance of *North C*, a compiler available in the public domain. It was written mostly by Steve Hawtin, who was largely responsible for putting a complete C environment together all on a single disk.

Those of you with programming experience on other systems will face three basic problems. First, you'll need to understand a suitable language. This, to all intents and purposes, means becoming competent at C.

Even if you were wishing to work with assembler, or a language like Modula2, you would still need some understanding of C in order to understand the Amiga's reference manuals.

Second, you will have to come to terms with the Amiga's facilities and technical documentation – a frightening task for newcomers and for those coming from the relatively simple, 8-bit computer world.

Third, you'll need to learn how to break problems down into manageable pieces.

One of the major stumbling blocks for many would-be programmers is that they have never been taught how to translate their ideas into forms that can be physically coded.

This first step is something I'll be looking at in more detail next month.

is safer to always place assembler code into a separate module.

SAS/C Conventions

Upon entry to a function in *SAS/C*, the stack, under conventional parameter passing conditions, contains the function arguments placed immediately above the longword return address which register A7 (the stack pointer) points to. The arguments appear in left-to-right order with the leftmost item being the one immediately above the return address.

Here are some standard function entry steps that must be carried out:

- Save register A5, which contains the previous function's stack frame pointer. The best idea is to push it on to the stack.

- Copy the contents of A7 into A5, thereby establishing a frame pointer for the current function which allows you to access the arguments indirectly using the A5 base value.

- Subtract any stack work area needed from A7.

If the work area needed is less than 32K, these steps can be achieved with the 68000's LINK instruction. *SAS/C* expects registers D2-D7, A2-A4 and A6 to be intact on return, so if any of these registers are to be used they must be preserved. Again, it is common practise to place them on the stack.

The above stack-orientated procedure forms the basis of a powerful general parameter passing technique – something well worth learning about. *SAS/C*'s register argument facilities, although good for speed, are less useful. For details of this approach the place to look is the *SAS/C* compiler reference manual.

Function return values are passed back in one or more registers, depending on the data type declared for the function in question. Figure 1 below shows the return value details that must be adhered to.

If the function returns an instance of a structure or a union – as opposed to a pointer to the object – then it must define a static work area (NOT on the stack) to temporarily hold the returned object. In these cases the function should return in D0 a pointer to the temporary copy.

Having set up the required return value the routine needs to reverse its entry steps, restoring the registers, advancing the A7 stack pointer past the work area and restoring the previous frame pointer to A5 before exiting via an RTS instruction. Again the 68000 has an unlink instruction (UNLK) specifically intended to simplify these operations. Note that it is the job of the calling function, and not the called function, to remove any arguments from the stack.

BLITS & BOBS

Unix was written in assembly language, then C was written under good old Unix in assembly language, then Unix was re-written in C, then C was re-written in C. Phew.

Aztec C Conventions

The Aztec compiler exports the name of a function or variable by truncating the name to 31 characters and prepending the underscore character, as mentioned earlier.

The function entry rules, which are similar to SAS/C, are as follows: Upon entry to a function the stack contains the function arguments placed immediately above the longword return address (which register A7, the stack pointer, points to). The Aztec arguments appear in left-to-right order with the leftmost item being the one immediately above the return address.

The *Aztec* technical manual says that register usage is implemented according to the Amiga guidelines, so all used registers except for D0, D1, A0 and A1 must be stored and reinstated before the assembly language routine returns. However, in the assembler section it states that registers D0-D3, A0, A1 and A6 are available as work registers and follows this statement by saying that there is no need to preserve the values of work registers for other routines. I'd recommend sticking to the former, more restricted convention until you hear otherwise. It works and it is definitely safe.

Inline or embedded assembler code must also preserve the contents of the non-scratch registers – that's all except D0, D1, A0 and A1 – and in addition should not not make any assumptions about the contents of the processor registers; the code the compiler currently generates for particular C statements might well change in later releases.

The *Aztec* function return conventions again use the D0 and D1 data registers.

Two examples

If all the references and directives in the above stages are correct, the rest is easy. The C source is compiled, the assembly language code assembled, then the modules are linked together with the startup code to produce an executable program.

Both the examples perform similar processes: Each asks the user to type in a string, and then calls an assembly language routine called Convert(). The assembler routine performs an exclusive-or (EOR) of all bytes in the string which are neither the NULL terminator nor equal to the mask value itself, thus protecting C's definition of a string by ensuring that we don't produce any NULL values within the body of the string. Having done that, the program prints the modified string, repeats the Convert() process and prints it again. The second EOR process does of course result in the original input string being produced. This technique is the basis of a great many simple encrypt/decrypt schemes. Where the coding differs is that in the first

Figure 1: SAS/C return value details

Return type	Size	Pass back details
char	8	Low byte of D0
short	16	Low word of D0
long	32	All of D0
float	32	All of D0
pointer	32	All of D0
double (IEEE)	64	D0 and D1 (D0 high)
double (FFP)	32	All of D0

SHOPPING LIST

Manx's *Aztec C*:
***Professional*..............£129.95**
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Distributed by **Precision Software**, 6 Park Terrace, Worcester Park, Surrey KT4 7JZ ☎ 081 330 716

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example, the assembler routine is directly accessing the global variables g_input_string and g_EOR_mask present in the C source code. In the second example these variables are't global, and both the start of the string and the EOR mask value are given to the assembler routine as parameters – in other words, the values are provided as arguments during the Convert() call.

This means that in the second example we have to get those arguments from the stack. Here is the run down on what has happened just prior to entering our assembly language patch: The arguments will have been pushed, in left-to-right order, on to the stack. Then the return address will have been placed on the stack. My second assembler patch uses a LINK a5,#0 instruction which pushes the contents of a5 on to the stack as well. The result? To access the two arguments of the C function we have had to use positive offsets of 8 and 12 respectively.

You'll notice in the pieces of assembler code that only the scratch registers A0 and D0 are used. This means that for the examples it is not necessary to preserve register contents on the stack. Despite this, in the second of the assembler patches I have included movem instructions to save and restore data registers D2-D7 so you can see exactly where in the code those push and pop operations would be carried out had registers D2-D7 been in use. AS

LISTINGS ● LISTINGS ● LISTINGS ● LISTINGS ● LISTINGS ● LISTINGS

```
/* example1.c  - uses Exclusive ORing patch via GLOBAL variables */

#include <exec/types.h>
#include <stdio.h>

#define MESSAGE1 "Please enter a string\n"
#define MESSAGE2 "Converted string is..........."
#define MESSAGE3 "String after 2nd conversion..."
#define LINEFEED  10
#define MAX_CHARS 80
#define EOR_MASK  0x1F
TEXT g_input_string[MAX_CHARS+1];     /* space for the user's string
*/
UBYTE g_EOR_mask=EOR_MASK;       /* Exclusive-ORing conversion mask
*/
main()
{
WORD  keyboard_character; UBYTE count=0;
printf(MESSAGE1);
while ((keyboard_character=getchar())!=LINEFEED)
    {
    if (count<=MAX_CHARS) g_input_string[count++]=keyboard_character;
    };
g_input_string[count]=NULL;                        /* add terminal NULL
*/
Convert();                                           /* EOR the string
*/
printf("%s %s \n",MESSAGE2,g_input_string);       /* show user
converted string */
Convert();                                        /* 2nd EOR operation
*/
printf("%s %s \n",MESSAGE3, g_input_string);    /* show string again
*/
}
```

Our first example, above, shows the C code that calls the patch without argument passing. Note, the corresponding assembler routine, below, is directly accessing the global variables g_input_string and g_EOR_mask present in the C source code.

```
        opt L+
*=====================================================*
* example1.s: assembler patch without argument passing *
*-----------------------------------------------------*
* a0 is loaded with the starting address of the input string

        XDEF    _Convert
        XREF    _g_input_string
        XREF    _g_EOR_mask

_Convert move.l  #_g_input_string,a0         start of string
        move.b  _g_EOR_mask,d0               get mask value
        subq.l  #1,a0

CONVERT_LOOP:
        addq.l  #1,a0                        move to next byte
        tst.b   (a0)                         check it
        beq     FINISH                       quit if NULL terminator
        cmp.b   (a0),d0                      will it EOR to NULL ?
        beq     CONVERT_LOOP                 if YES don't EOR it
        eor.b   d0,(a0)                      safe to convert
        bra     CONVERT_LOOP                 keep going
FINISH  rts                                  back to C
```

```
/* example2.c  - version which uses parameter driven Exclusive ORing
patch */

#include <exec/types.h>
#include <stdio.h>

#define MESSAGE1 "Please enter a string\n"
#define MESSAGE2 "Converted string is..........."
#define MESSAGE3 "String after 2nd conversion..."
#define LINEFEED  10
#define MAX_CHARS 80
#define EOR_MASK  0x1F

main()
{
TEXT input_string[MAX_CHARS+1];       /* space for the user's string */
UBYTE EOR_mask=EOR_MASK;         /* Exclusive-ORing conversion mask */
WORD  keyboard_character; UBYTE count=0;
printf(MESSAGE1);
while ((keyboard_character=getchar())!=LINEFEED)
    {
    if (count<=MAX_CHARS) input_string[count++]=keyboard_character;
    };
input_string[count]=NULL;                        /* add terminal NULL */
Convert(input_string, EOR_mask);                     /* EOR the string */
printf("%s %s \n",MESSAGE2,input_string); /* show user converted
string */
Convert(input_string, EOR_mask);                 /* 2nd EOR operation */
printf("%s %s \n",MESSAGE3, input_string);     /* show string again */
}
```

This second example, above, shows the C code that calls the patch *with* argument passing. In this example, the variables are not global and both the start of the string and the EOR mask are given to the assembler routine, below, as parameters.

```
          opt L+
* ================================================= *
* example2.s: assembler patch with argument passing   *
* ------------------------------------------------- *
          XDEF    _Convert

_Convert  link a5,#0                    don't need any workspace
          movem.l d2-d7,-(sp)           normally where we save
          move.l  12(a5),d0             retrieve mask value
          move.l  8(a5),a0              retrieve string pointer
          subq.l  #1,a0

CONVERT_LOOP:
          addq.l  #1,a0                 move to next byte
          tst.b   (a0)                  check it
          beq     FINISH                quit if NULL terminator
          cmp.b   (a0),d0               will it EOR to NULL ?
          beq     CONVERT_LOOP          if YES don't EOR it
          eor.b   d0,(a0)               safe to convert
          bra     CONVERT_LOOP          keep going

FINISH    movem.l (sp)+,d2-d7           normally where we restore
          unlk    a5
          rts                           back to C
```

QUESTIONNAIRE

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Thankyou for your time and trouble. AS

Vector Check

Jolyon Ralph guides you safely through opening libraries, allocating memory, checking your input, cleaning up memory and safe exiting

BEGINNERS START HERE

Everybody seems to think assembly languages are difficult to learn. This is simply not true – the instruction sets of most processors , even powerful ones like the Amiga's 68000, are quite limited and there is nothing complex about the operations involved. Each instruction carries out some elementary task, perhaps adding two values together or copying the contents of one memory location to another.

The problems arise when you try to combine hundreds of thousands of these elementary instructions into a program that does a particular job. It is a task which is prone to error and tends to be time consuming. Assembly language programming requires attention to detail and the programmer has to have the ability to break down a programming problem into more easily managed sections so that any difficult coding problems can be solved as they crop up.

The benefits? First, you'll be able to make your programs run at the ultimate speed. Second, you will get a 'gut feeling' for what computing is all about at the nuts and bolts level. It is something that will help you understand more about high-level languages and the problems they have to address.

The Amiga adds another dimension with the sheer complexity of its operating system. Before you can comfortably write assembler code to do a particular job, it's necessary to know enough about the operating system and its library code system call arrangements to work out what the Devil your assembler code should be doing.

continued on page 78

Starting this issue and finishing next month is the source code to a program called *VectorCheck*. It will introduce you to library routines, opening screens and windows, and most of the other basics of Amiga machine code programming.

For more experienced coders who find linked lists and IDCMP old hat, I've included some example code for setting up a User Copper list attached to an Intiution screen. Beginners – if you don't know the difference between a copper list and a coprolite, don't worry. All you need to know at this stage is it makes pretty rainbow patterns (which you won't see until you get next month's part, anyway.)

Let's start by going through code listed on pages 79 and 80. The first line is an option command – an instruction for the assembler. The l- tells the assembler that you want an executable (program) file and the d+ puts debugging information into it so that the file is readable by monitors like Monam2.

Next is the Section command. Sections are an important concept. When your Amiga loads a file from disk, it doesn't put it in a fixed place. The code can load into any location in memory and one file can be split into small lumps loaded in different areas of memory. There is a very good reason for this. The Amiga multi-tasks, so you can't write a program and say: "My program will load into address $40000". Well, you can actually, but you shouldn't. I mean, what if somebody else wrote a program that also needs to load into $40000? You wouldn't be able to run both at once, negating the whole point of multi-tasking.

Getting loaded

The Amiga has a special load file format which takes care of this, meaning a file can load into any part in memory which is free and it will work fine. Don't worry about the load file format; it's all taken care of by the assembler. This is explained in great depth in *The Kickstart Guide to the Amiga*, by Ariadne Software – an excellent read.

The Section command tells the assembler that the following block is either code (68000 instructions) or data (such as text and graphics). It also tells the assembler whether this particular block needs to load into chip, fast or public memory. Next come the include files.

Includes make it much much easier to call library routines. Libraries are collections of standard system routines that your program can call. They can be used from any language – machine code, C, Basic, Modula II – in exactly the same way.

A Library is accessed by jumping to a negative offset from its base address. The base address is the beginning of a table of entry points in memory working backwards. It looks a little like this:

THE LIBRARY JUMP TABLE

```
JMP   Routine4
JMP   Routine3
JMP   Routine2
JMP   Routine1
JMP   Extfunc    ; These routines
JMP   Expunge    ; would not be
JMP   Close      ; called directly
JMP   OPEN       ; from your code
librarybase:
```

These can either jump to routines stored in the Kickstart ROM or to routines in memory, because libraries can be loaded from the LIBS: directory of your boot disk. Remember, the only safe way to call routines in Kickstart is to use library call. The code to call a library function is therefore:

```
move.l  librarybase,a6
JSR-xxx(a6)
```

which calls the library routine at offset –xxx.

The library offsets are documented in the Amiga manuals; more usefully, they are stored as equates in the include files. For example, there is a function in the Exec library called OpenLibrary which our source code makes use of right at the beginning. All this does is open up a new library. Note that we use a6 for the library base register.

● This is the first rule of programming by libraries: always use a6 for the base register.

If we look at the include file that contains the offsets for the Exec library functions – exec/exec_lib.i – it's a standard ASCII file that you can look at or print out. It contains:

```
_LVOOpenLibrary EQU -552.
```

continued on page 78

JARGON BUSTING

CHIP MEMORY: Memory that can be accessed by the custom chips. Things like graphics data and sound samples must be stored in chip memory.

COPPER LIST: A program written for one of the Amiga's special chips, the Copper. See the Amiga Hardware Reference Manual for more information on programming this chip.

COPROLITE: Fossilised or petrified excrement. Often examined for information on the dietry habits of dinosaurs.

MONITOR: A program that can help you remove bugs from your code.

FAST MEMORY: The opposite of chip memory. Data in fast memory cannot be used by the Amiga's custom chips. It's called fast because code runs faster in this memory.

IDCMP: Intuition Direct Communications Message Port, a fancy way of getting input from things like the mouse and keyboard.

INCLUDE FILES: Files that come with your assembler, they contain definitions of all the system structures.

PUBLIC MEMORY: Either chip or fast memory, if you specify public memory the Amiga will use fast memory if it is available, otherwise it will use chip memory.

continued from page 77

Learning about these Amiga facilities alone is a massive challenge simply because there is so much to understand. There is no easy road; you've just got to sit down and work hard at it. Don't get disheartened. We have all found the Amiga a long, hard slog, but take it from me, it does get easier after a while. If you persevere and get through the first couple of years without giving up, you'll be home and dry.

Before you start, you will need a few things. Firstly, a good assembler. The only two I can recommend are Hisoft's *Devpac* and Argonaut's *ArgAsm*, both of which have been tested with my source code. PD assemblers won't work because you need the Amiga include files, which are not in the public domain.

If you want to understand what is going on you will need the two Amiga ROM Kernel Reference Manuals – *Includes & Autodocs* and *Libraries & Devices*. These are a little pricey but are an essential part of any serious Amiga programmer's bookshelf.

If you have any money left after kitting yourself out, have a look at Ariadne's *Kickstart Guide to the Amiga* and Compute!'s *Mapping the Amiga*.

You can either just replace the –xxx in the above code fragment with –552, which is not a good idea because when you read the code later you won't understand what it's doing, or better still, change it to:

```
include "exec/exec_lib.i"
move.l  EXECBASE,a6
jsr     _LVOOpenLibrary(a6)
```

With this, the assembler sees the _LVOOpenLibrary, says "Oh yes, that means –552", and assembles it correctly. And it remains readable.

If you look at the example code, you won't see any of that because the include files also provide an assembler macro which gives you new commands: CALLEXEC, CALLINT, CALLGRAF and CALLDOS. There are others for other libraries, but only these four are used in this source. You could replace the two lines after the include line with:

```
CALLEXEC OpenLibrary
```

which is an awful lot simpler. The assembler converts it back to the original two lines when assembling. VectorCheck uses OpenLibrary to open graphics.library, intuition, library and dos.library so it can use the functions from these. You set a1 to point to the name of the library, which is an ASCII string (look at the data section at the bottom of the code, you will see ASCII strings for the three libraries we open), and set d0 for the lowest acceptable version number of the library; this program uses zero so it should work with everything. The routine returns the library base address in d0. You need this base address to access any function from that library.

Luckily for us the Exec library is always open, so we don't have to worry about how to open a library to use OpenLibrary. The Amiga stores the EXECBASE value at location 4 in memory – the only fixed memory location the Amiga operating system uses. (We'll see more fixed locations next month, but those are to do with the 68000 and the custom chips.)

Now we have looked at the basics of libraries, let's take a look at two of the fundamental parts of Intuition – screens and windows.

Figure 2: IDCMP Flags

Name	Report
SIZEVERIFY	Sizing request
NEWSIZE	Size of the window has been changed
REFRESHWINDOW	Window's contents need to be refreshed
ACTIVEWINDOW	Window has been activated
INACTIVEWINDOW	Window has been deactivated
CLOSEWINDOW	Window's close gadget has been pressed
GADGETDOWN	Gadget has been pressed down
GADGETUP	Gadget has been released
REQSET	First requester in the window has been clicked
REQVERIFY	There has been an attempt to open a requester
REQCLEAR	Final requester has been removed from the window
MENUPICK	A menu item has been selected
MENUVERIFY	There has been an attempt to use a menu
MOUSEBUTTONS	A mouse button has (or has not) been pressed
MOUSEMOVE	All mouse movements
DELTAMOVE	Mouse coordinates relative to last position
INTUITICKS	Timer events every 1/10th of a second
NEWPREFS	Preferences settings have been changed
DISKINSERTED	A disk has been inserted
DISKREMOVED	A disk has been removed
RAWKEY	All unprocessed (raw) keypresses
VANILLAKEY	ASCII key values

Screens and windows

A screen can be any resolution or number of colours the Amiga hardware allows. The Amiga is unique among personal computers in that it allows you to have two programs running on the same display with totally different resolutions and colours; drag the *Deluxe Paint* screen down to reveal Workbench and see what I mean. You can set up your own screen quite easily using an Intuition library call called OpenScreen. See Figure 1 for a list of available option flags. Call the OpenScreen function with a0 pointing to a NewScreen structure. There is one at the bottom of the code for you to look at; it's a collection of long words (dc.l), short words (dc.w) and the odd byte (dc.b) or two. You've just sussed structures.

Structures are a stored collection of numbers, addresses and strings etc. Point a register at it – usually a0 or a1 – and let the library do the rest.

There is a huge number of structures used for programming the

Figure 1: Screens and Windows

To change the flags in structures like the NewScreen structure for different types of screen just list all the flags you want separated by a pling ! –

CUSTOMSCREEN!SCREENQUIET. Flags for the screentype parameter in the NewScreen structure are:

CUSTOMSCREEN This is your own screen and is not a system screen

CUSTOMBITMAP You have to allocate the memory yourself for the screen

SCREENBEHIND Opens the screen that is behind the workbench screen

SCREENQUIET The operating system does not draw gadgets on the screen

The flags in the NewWindow structure determine the characteristics of your window and are specified in the same manner as those for screens. Flags for the window type parameter in the NewWindow structure are:

WINDOWSIZING You can change the window size

WINDOWDRAG You can drag the window about

WINDOWDEPTH It has depth gadgets

WINDOWCLOSE It has a close gadget

SIZEBRIGHT The right-hand border of the window has space for a scroll gadget

SIZEBBOTTOM The bottom row of the window has space for a scroll gadget

GIMMEZEROZERO Window with two planes. Uses lots of Random Access Memeory

SIMPLE_REFRESH Your application redraws the window if it's covered over

SMART_REFRESH The operating system redraws the window if it is covered

SUPER_BITMAP Gives you low-level control over the window's display memory

BACKDROP The window fills the entire screen as a background

REPORTMOUSE Reports mouse coordinates when the window is active

BORDERLESS The window doesn't have a border drawn.

ACTIVATE The window is automatically activated when it is opened

RMBTRAP Right mouse buttons sent as IDCMP rather than pull-down menus

Amiga. If you want to try and work out what they do, get Compute!'s *Mapping the Amiga*. The structures are explained in the official ROM Kernel Manuals, but mostly in C, so unless you know how to translate C into machine code, you are going to get confused.

Call the OpenScreen function and it returns another pointer, this time to a screen structure which it has created. The screen should also now be open, unless something has gone wrong, in which case the pointer will be zero. As the memory at location zero is busy being used by the 68000 for something else, there is no chance that the structure could correctly be at location zero.

● So, the second rule of programming by libraries is: always check for errors.

There are plenty of reasons why the OpenScreen call could fail. You could have your parameters wrong, or you could have run out of memory.

This month's source checks the return codes from all calls opening things. If they fail, the program jumps to the Abort code, which checks everything in turn to see if it was successfully opened, and if it was, closes it again before leaving.

● The third rule of programming the Amiga by libraries: always leave the Amiga how you find it. Don't leave binary litter around. Close libraries when they are not needed, close screens and windows before your program exits.

After the screen has been set up we can open our window. This is similar to the way we did OpenScreen. It calls a function called OpenWindow, which takes a pointer to a NewWindow structure as its input. The output from this is a pointer to a window structure, which is stored in the same way as a screen.

The library calls from here down to MasterMainLoop are to set up the copper list that I talked of earlier. The data for the copper list will be shown next month, so we'll leave a discussion of this bit until then, except for AllocMem which is important. AllocMem allocates a block of memory for use by your program. Once allocated, the block of memory is yours to do with as you please; the Amiga will not load anything into it, it won't trash it at random and no other program will be able to allocate memory in that area. Other

LISTINGS ● LISTINGS ● LISTINGS ● LISTINGS ● LISTINGS ● LISTINGS

```
LABEL       INSTRUCT  OPCODE                     COMMENT

            opt       l-,d+

* Vector check code. Written by Jolyon Ralph.
* Gives lots of useful information
* on 68000 and system vectors.

            section   main,code

            incdir    "dh0:include/"
            include   "exec/types.i"
            include   "exec/exec_lib.i"
            include   "exec/execbase.i"
            include   "exec/memory.i"
            include   "graphics/gfx.i"
            include   "graphics/gfxbase.i"
            include   "graphics/graphics_lib.i"
            include   "graphics/view.i"
            include   "graphics/copper.i"
            include   "libraries/dos_lib.i"
            include   "libraries/dos.i"
            include   "intuition/intuition.i"
            include   "intuition/intuitionbase.i"
            include   "intuition/intuition_lib.i"

            include   "misc/easystart.i"         ; this *does*
                                                 ; contain code
                                                 ; not a true .i
                                                 ; file

            lea       IntName,a1
            moveq     #0,d0
            CALLEXEC  OpenLibrary
            move.l    d0,_IntuitionBase
            beq       Abort

            lea       GfxName,a1
            moveq     #0,d0
            CALLEXEC  OpenLibrary
            move.l    d0,_GfxBase
            beq       Abort

            lea       DosName,a1
            moveq     #0,d0
            CALLEXEC  OpenLibrary
            move.l    d0,_DOSBase
            beq       Abort

            lea       MyNewScreen,a0
            CALLINT   OpenScreen
            move.l    d0,MyScreen
            move.l    d0,mnw_screen              ; stick into
                                                 ; NewWindow
                                                 ; structure
            beq       Abort

            move.l    d0,a0
            lea       sc_ViewPort(a0),a1

            move.l    a1,MyViewPort
            lea       sc_RastPort(a0),a1
            move.l    a1,MyRastPort
            lea       sc_BitMap(a0),a1
            move.l    a1,MyScreenBitMap
```

```
LABEL       INSTRUCT  OPCODE                     COMMENT
            lea       MyNewWindow,a0
            CALLINT   OpenWindow
            move.l    d0,MyWindow
            beq       Abort

            move.l    MyScreen,a0
            moveq     #0,d0
            CALLINT   ShowTitle
            move.l    MyViewPort,a0
            lea       MyCmap,a1
            moveq     #32,d0
            CALLGRAF  LoadRGB4

Copper      move.l    #ucl_SIZEOF,d0             ; allocate mem for
            move.l    #MEMF_PUBLIC!MEMF_CLEAR,d1 ; UserCopList
            CALLEXEC  AllocMem

            move.l    d0,MyUCopList
            move.l    d0,a0
            move.l    #400,d0                    ; number of
                                                 ; commands
            CALLGRAF  UCopperListInit

            moveq     #$10,d4                    ; start
            move.l    #200,d3
            lea       colourtable,a3
.cloop      move.l    MyUCopList,a1              ; MyUCopList
            move.l    d4,d0
            move.l    #09,d1
            CALLGRAF  CWait
            move.l    MyUCopList,a1
            CALLGRAF  CBump
.back       move.w    (a3)+,d5
            bne.s     .ok
            lea       colourtable,a3
            bra.s     .back
.ok         move.l    MyUCopList,a1
            move.l    #$dff182,d0
            move.l    d5,d1
            CALLGRAF  CMove
            move.l    MyUCopList,a1
            CALLGRAF  CBump
            addq.w    #2,d4
            dbra      d3,.cloop

            move.l    MyUCopList,a1
            move.l    #10000,d0
            move.l    #255,d1
            CALLGRAF  CWait

            move.l    MyUCopList,a1
            CALLGRAF  CBump

            CALLEXEC  Forbid                     ; While building
                                                 ; the copper

            move.l    MyViewPort,a0
            move.l    MyUCopList,vp_UCopIns(a0)
            CALLEXEC  Permit                     ; Safe now!

            CALLINT   RethinkDisplay
            move.l    MyRastPort,a1
```

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programs can read and write to the memory – there is no hardware memory protection on the Amiga as there is in Unix – but for well-behaved programs this should not be much of a problem.

AllocMem takes two parameters – the first is the size of the block of memory you want to allocate, the second defines the type of memory you want to use. Whenever you allocate memory with an AllocMem you must do a FreeMem at the end of your code to de-allocate it (remember rule three). There is a rare exception to the rule here however. The particular structure I'm defining, a user copper list, has a library call to shut it down and this call frees the memory automatically. Trying to free a block of memory that is already free can be fatal.

Next comes the IDCMP check. IDCMP stands for Intuition Direct Communication Message Port, and is attached to your window. When a window is active (that is, when the title bar is not ghosted) any input from the keyboard, the mouse and so on, is sent to the message port for the window. This is how you can have two windows open and type into one without text appearing in the other.

When you set up your new window, there is a IDCMPFlags value. This is set with a number of flags to tell Intuition which input events you want the window to pass on to you and which ones you want it to ignore. Figure 2 lists the names of these flags and what they mean.

In VectorCheck we use GetMsg() in MasterMainLoop to see if there is an IDCMP message waiting for us. If there isn't, the program loops back, prints out some text with the current value of system vectors in (jsr UpdateVecs), and pauses for one second using the Delay() function before checking again.

When the close gadget is clicked, Exec sends us a message. It contains information about, for example, what type of event was received and the mouse coordinates at the time. When you receive a message you must reply to it with ReplyMsg() which gets rid of it so that you don't receive it mistakenly next time you check.

Because we are only detecting one type of IDCMP event – a CLOSEWINDOW gadget press, and once we receive this we quit – we don't need to check what type of event we are getting. Just click on the gadget and it quits. If you want to add RAWKEY to the IDCMPFlags in the window, you'll find that any keypress will also quit the program. After this is received, everything is closed down in reverse order.

● Rule number four: Close down things in reverse order to the way they were opened. If you close a screen while there is a window on it, the window falls off the screen and floats around memory, eating whatever it finds. Guru time. I'll be giving you the rest of the code next month, so till then, be seeing you. AS

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```
LABEL           INSTRUCT  OPCODE                      COMMENT

                moveq     #1,d0
                CALLGRAF  SetAPen

                move.l    MyWindow,a0
                move.l    wd_UserPort(a0),MyIDCMP

MasterMainLoop
                jsr       UpdateVecs
                moveq     #50,d1
                CALLDOS   Delay                       ; do a short
                                                      ; pause...

                move.l    MyIDCMP,a0
                CALLEXEC  GetMsg
                tst.l     d0
                beq.s     MasterMainLoop              ; no close, so go
                                                      ; to begining
                                                      ; of loop

                move.l    d0,a1
                CALLEXEC  ReplyMsg                    ; reply to message

Abort           move.l    MyUCopList,d0
                beq.s     .sk5
                move.l    MyViewPort,a0
                CALLGRAF  FreeVPortCopLists           ; free copper list
                                                      ; memory

                CALLINT   RemakeDisplay

.sk5            move.l    MyWindow,d0
                beq.s     .sk4
                exg.l     d0,a0
                CALLINT   CloseWindow

.sk4            move.l    MyScreen,d0
                beq.s     .sk3
                exg.l     d0,a0
                CALLINT   CloseScreen

.sk3            move.l    _IntuitionBase,d0
                beq.s     .sk2
                exg.l     d0,a1

                CALLEXEC  CloseLibrary

.sk2            move.l    _DOSBase,d0
                beq.s     .sk1
                exg.l     d0,a1
                CALLEXEC  CloseLibrary

.sk1            move.l    _GfxBase,d0
                beq.s     .sk0
                exg.l     d0,a1
                CALLEXEC  CloseLibrary
```

```
LABEL           INSTRUCT  OPCODE                      COMMENT

.sk0            clr.l     d0                          ; return code
                rts                                   ; quit program

                section   os_Stuff,data

_DOSBase        dc.l      0
_GfxBase        dc.l      0
_IntuitionBase  dc.l      0
MyScreen        dc.l      0
MyWindow        dc.l      0
MyViewPort      dc.l      0
MyRastPort      dc.l      0
MyScreenBitMap  dc.l      0
MyUCopList      dc.l      0
MyIDCMP         dc.l      0

MyNewScreen                                           ; An Intuition
                                                      ; NewScreen structure
                dc.w      0,0                         ; left,top
                dc.w      640,256                     ; width,height
                dc.w      3                           ; depth
                dc.b      1,2                         ; pens
                dc.w      V_HIRES                     ; ViewModes
                dc.w      CUSTOMSCREEN!SCREENQUIET    ; screen mode
                dc.l      0                           ; Font
                dc.l      MyTitle                     ; Title
                dc.l      0                           ; Gadgets
                dc.l      0                           ; Points to my BitMap
                                                      ; structure.
                even

MyNewWindow                                           ; Borderless
                                                      ; backdrop window
                                                      ; for my screen
                dc.w      0,0                         ; left,top
                dc.w      640,256                     ; width,height
                dc.b      1,2                         ; pens
                dc.l      CLOSEWINDOW                 ; IDCMP FLAGS
                dc.l      NOCAREREFRESH!WINDOWCLOSE!BACKDROP!ACTIVATE
                                                      ; Flags
                dc.l      0                           ; FirstGadget
                dc.l      0                           ; ImagePtr
                dc.l      MyTitle                     ; Title (not needed)
mnw_screen      dc.l      0                           ; Pointer to
                                                      ; screen
                dc.l      0                           ; Pointer to bitmap
                dc.w      0,0,0,0                     ; Min&Max
                                                      ; width/height
                dc.w      CUSTOMSCREEN                ; Type
                even
```

*** to be continued next month...**

Cracking the Shell



Mark Smiddy reveals and explains the mysterious workings of the Amiga's device operating system

BEGINNERS START HERE

DOS is an acronym usually taken to mean Disk Operating System, but on the Amiga it means much more than that. AmigaDOS is a high-level user interface to all the machine's devices – a device operating system. Devices can be real hardware entities, such as disks; virtual devices simulated in software like the keyboard and screen; or logical device assignments – hard disk partitions and disk names.

Although this may seem complex initially it is beautifully simple in practise, in that the user can talk to any device in the same way. In other words you can use the same command to copy text from disk to disk, as well as disk to screen or disk to printer.

This series is an introduction to AmigaDOS which will eventually build into a complete guide to the DOS system. Later instalments will cover some of the system's powerful features, the programming of it at script (batch) level as well as from other languages. However, to keep it interesting, a good knowledge of the Workbench is assumed. You should understand terms like initialise, click, double-click, open and so on. If they are unfamiliar, don't worry. You should be able to pick things up quite easily with a spot of common sense.

The series will also concentrate on the 1.3 and 1.3.2 models since these are the most common. The relevant version number is printed on your Workbench disk – not the Kickstart version. Users of the 1.2 software should either buy the Enhancer software or obtain ARP 1.3 (a Shareware AmigaDOS replacement). The main reason for this is the

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Welcome to the first of my regular columns on AmigaDOS. Let's kick right off with getting into the Amiga's Shell and imposing a ban on egg jokes.

On Workbench 1.3, you can start the AmigaDOS command line interpreter by opening the Shell icon. (Workbench 1.2 users will have to activate the CLI icon first from Preferences. The actual icon lives in the System drawer.)

After a few seconds a window will open, similar to the one in Figure 1. The Shell and CLI windows are actually AmigaDOS device emulations called consoles. Three different flavours are available with the various versions. The earliest still in use, supplied with Workbench 1.2, has no editing facilities whatsoever, save for the delete key. For Workbench 1.3, a new console device was added offering simple line editing and a history buffer – this one is used by Shell. Workbench 2 also uses Shell but the implementation is slightly different.

BLITS & BOBS

AmigaDOS was developed in BCPL unlike the rest of the system which was programmed in C. For the new release 2, AmigaDOS has been completely re-written in C.

At the top left of the screen is the prompt. This is AmigaDOS's way of telling you it is ready and waiting for its next command. On CLI windows the prompt follows the format:

```
x>
```

where [x] is the current CLI process identity – the CLI number. > is used as a separator but can be changed. Shell windows use another prompt:

```
x.nnnn>
```

where [x] is the CLI number and [nnnn] is the current directory pathname. As before, the > symbol is just a separator.

Shell's initial prompt is normally:

```
1.SYS:>
```

For the sake of clarity, I'll adopt a standard CLI prompt 1> when introducing a command line. You must not type this.

Giving Commands

You give commands to AmigaDOS in the form of written (typed) instructions but it will not act until you press either the Return (ø) or Enter key. Therefore, if you are instructed to enter the following command line:

```
1>DIR
```

You would press [D] [I] [R] and [ø] or [Enter]. Also, many commands take optional parameters, called arguments. All arguments must be separated from the command and each other by at least one space, as in the following line:

```
1>DIR OPT A
```

Probably the most important 'grass roots' commands in AmigaDOS are those concerned with directory and file – object – management. The most important two are DIR and CD. Try this:

```
1>DIR
C (dir)
Devs (dir)
Fonts (dir)
L (dir)
Libs (dir)
S (dir)
AmigaBASIC
AmigaBASIC.info
```

AmigaDOS responds by listing the names of all the files and directories contained in the current directory. The example listing shown is from a theoretical disk; your screen will look slightly different. The command gets its name from an abbreviation of DIRectory. Directories contained in this listing are highlighted with (dir) automatically.

Changing DIRectory

AmigaDOS operates what is known as a hierarchical filing system. This sounds rather grand, but is very simple when you know how. Disks are organised into directories and every disk has at least one – called the root directory. The root directory is always at the top of the hierarchy. Directories appear on the Workbench disk as drawers, but prior to Workbench 2 it is not generally possible (or practical) to show all the directories as drawers. A typical disk hierarchy is illustrated in Figure 1 (over). It looks something like the roots of a tree. Notice how all the sub-directories (siblings) connect back to the root directory by pathways or paths. This is rather like a family tree and is, in fact, where the analogies of hierarchies, parents and children come from. Sibling is just another term for child – the two are often used interchangeably.

● Tip: You can press the spacebar at any time to stop AmigaDOS producing written output. Printing can be restarted with the backspace (") key. This can sometimes make commands appear to fail – watch out for this.

AmigaDOS uses the / (slash) symbol to indicate a path and the : (colon) to indicate the root directory of any disk. Memorise these – you will use them a lot. Now study Figure 2 which is a slightly simplified

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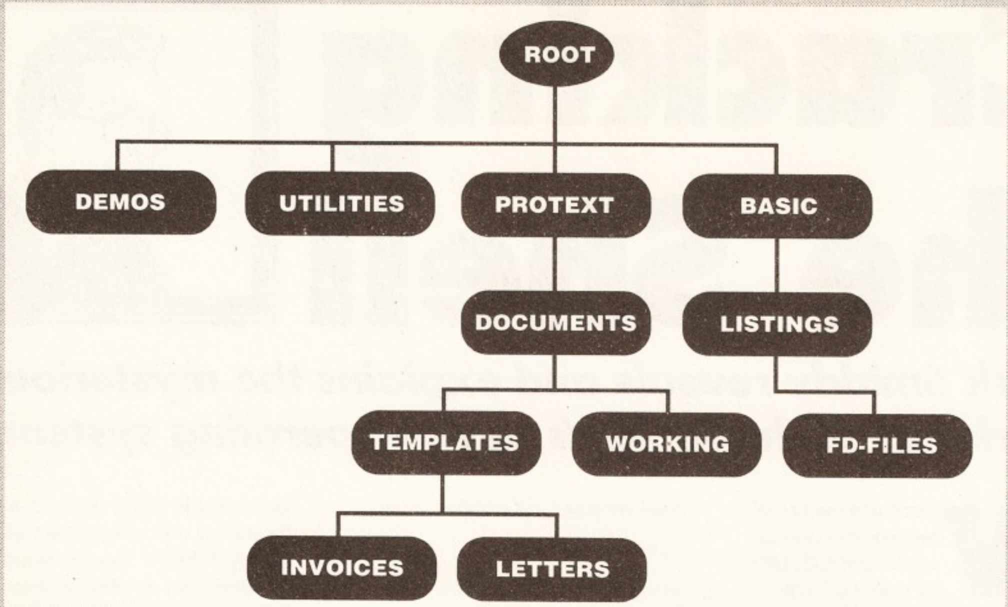


Figure I: A typical disk hierarchy showing the inverted tree structure by which files are linked.

version of the directory structure shown earlier. This time, the directory names have been replaced with letters and the absolute paths shown. Absolute paths can be used to get from any part of a disk hierarchy to any other. However, it is more usual to utilise the simpler method of relative paths.

Stop scratching

At about this point many of you will be having a severe attack of *piuritus cerebrum* – itchy brain. Relax. What we have been through is all just background knowledge which will become clear in time.

Before learning how to change directory, it is better to know how to find out where you are. This is achieved with the CD (Change Directory) command like this:

```
1>CD
Workbench1.3:
```

Workbench1.3 shown is the current volume (disk) name and the position in the hierarchy (:) or root directory. CD and AmigaDOS being the weird beasts they are, could have replied:

```
1>CD
SYS:
```

Which in this case mean precisely the same thing because Workbench1.3 was also used as the boot disk. The name SYS is a logical device name which was assigned automatically to the boot disk on startup. Once again, some of these terms may be a little unclear at the moment, but it is absolutely vital you understand the concepts giving rise to these, even if they fail to mean anything at this stage.

In order to move into a directory you must know the name of the directory you want to go to. This can normally be found by performing a DIR on the disk first. Try this:

```
1>CD DEVS
```

Which in English reads: "Change current directory to DEVS." The name

> **BLITS & BOBS**
>
> *Most commands can be stopped using the [Ctrl]-C break sequence. Scripts (like the startup-sequence) only respond to [Ctrl]-D.*

DEVS is passed to the CD command as an argument – more on those later in the series. AmigaDOS 1.3 users will notice the prompt also changes to indicate this. Just to confirm where you are, type CD again:

```
1>CD
Workbench1.3:Devs
```

Notice how the case of the letters may differ from what you type. AmigaDOS is not case sensitive, but object names are. The directory name is as it appears on the disk.

Single drive volumes

AmigaDOS uses a system of transient commands. This means every time you execute an AmigaDOS command it is loaded from disk, executed, then flushed from memory.

This might seem a little ludicrous because it give rise to a lot of disk swapping, especially if you only have a basic machine with one drive. Transient commands are used because they save an enormous amount of memory and are easy to update. Imagine if DOS was on ROM and DIR had a serious bug – this would create havoc because ROMs have to be physically replaced by qualified engineers. As it is, bugs can be fixed by simply releasing a new version on a floppy disk.

So much for the advantages, but this gets a little tiresome when using AmigaDOS on a single drive machine. Take this example:

```
1>DIR DF0:
```

First, let's break this line down into its component parts:

DIR – an AmigaDOS command to list the directory contents.

DF0: – the device name for the internal drive – Disk Floppy 0.

Note how device (and volume) names are always post-fixed with a colon. This acts as a separator and indicates the root directory of all filing system (data storage) devices.

Used in this way, AmigaDOS tries to read the root directory of the disk in the internal drive. This is fine if the disk just happens to be your startup disk, but try executing this command with a different disk.

Unless you are lucky enough to be using a hard disk, AmigaDOS responds with a requester asking you to replace volume xxxx (usually Workbench – the boot disk) in any drive. Single-drive users are then confronted with a paradox. On replacing the boot disk in DF0: the machine then reads the directory from that disk.

This happens because AmigaDOS knows its transient

greatly enhanced CLI window. Anyone lucky enough to own an Amiga 3000 running Workbench 2 can relax; any major changes will be highlighted. Or you can boot into Workbench 1.3 as described in the user manual.

AmigaDOS vs. Workbench

Some of you will have upgraded to an Amiga after experience of other machines, many of which will have had some form of command-line disk or tape operating system. For those only used to WIMP systems like Intuition, GEM or Windows, a few words of explanation. AmigaDOS commands are called from a command line interpreter.

It's bit like older adventure games in which the player describes what he or she wants to do using English commands: GET SWORD, THROW KNIFE AT WIZARD, and so on. The latest adventures allow you to manipulate objects with a mouse in the same way as you would communicate with Workbench. Although a system in which you have to describe every action might seem odd, it is actually very powerful.

For example, imagine you have opened a text file with a viewer such as More. (Document icons are usually configured to do this for you.) You now want hard copy on the printer so you drag the icon to the Printer. But wait, the printer doesn't have a Workbench icon. (That is why the Workbench replacement, Jazzbench, supplies device icons for the printer) You can get round this by loading the file into a word processor – NotePad would do – and printing it from there but it is rather long winded. Once you get used to AmigaDOS, this sort of thing is a doddle.

JARGON BUSTING

CHILD: See sibling
DIRECTORY: part of a disk where files are grouped together.
FILE: block of stored information.
HANDLES: I/O ports where processes can gather and output information. C programmers should already know these as STDIN, STDOUT and STDERR.
PROCESS: a task running under AmigaDOS.
OBJECT: a file or directory.
ORPHAN (PROCESS): Sibling processes can be orphaned if the parent process shuts down – this should never happen.
ORPHAN DIRECTORY: A sibling directory which has lost its parent. This only happens when the disk structure is corrupted and can sometimes be recovered using DiskDoctor.
ROOT DIRECTORY: The first directory on any disk. All other sibling directories link back to this one.
SIBLING (DIRECTORY): A directory contained within a directory. All siblings must have a parent – which can be the root directory or some other sibling. They may also contain their own children.
SIBLING (PROCESS): A process which has been created (spawned) by another process and has inherited its handles.
VOLUME: a disk or a disk's name.

commands – DIR in this case – are located on the boot disk and asks for it back. When the disk is replaced, DIR is loaded and executed. However, the command line argument is interpreted by DIR, and because it says DF0: the disk loaded in DF0: at that moment is read.

There are several ways round this problem. Which you use depends on the version of AmigaDOS installed on your machine, the amount of memory you have and how well you label your disks. The simplest method works with all versions of AmigaDOS and works even when memory is tight. The command looks like this:

```
1>DIR DF0: ?
NAME,OPT/K,ALL/S,DIRS/S,
INTER/S,FILES/S:
```

What makes this command special is the use of a trick. Most AmigaDOS commands have an interactive mode triggered by the query (?) operator. (Interactive mode can be used for some very advanced techniques which force AmigaDOS to do things automatically.) For the sake of this example, interactive mode has two important features. First, it offers a reminder of the command's options; second it forces it to load and wait. This is what makes it so useful.

Consider the previous example where AmigaDOS always lists the directory of the boot disk. If ? is specified before pressing Enter, AmigaDOS asks for the boot disk but the command halts and waits for user input. At this point you can swap to the disk you want a directory of and press [Enter].

Exposing the kernel

This is not unlike using a sledge-hammer to crack a nut, but it is relatively painless, works and conserves memory at the same time. A better technique – certainly a better behaved approach – is to use a volume name. A volume name is the name you give the disk after formatting it – not necessarily the name on the label. For instance, to get a directory of the Extras disk you could enter:

```
1>DIR Extras1.3:
```

As before, the command is loaded from the boot disk, but instead of listing the contents of the disk in DF0:, AmigaDOS asks you to "insert volume Extras1.3 in any drive". The problem with this approach is brought about through Workbench and AmigaDOS allowing spaces in object names – disk names in this case. Let's say you had a disk called: 'Copy Of Workbench1.3'.The following line will not work:

```
1>DIR Copy Of Workbench1.3:
```

because AmigaDOS thinks the disk is called "Copy" and the rest of the line is arguments. Remember how arguments are separated from the command and each other by spaces? The solution is to surround the volume name in quotes:

```
1>DIR "Copy Of Workbench1.3:"
```

At this stage, you may wonder why bother to use volume names at all. If you have more than one drive, they seem pointless and long winded.

What you use is up to you, but both methods have pros and cons. Device names are shorter, but disk names are more reliable. This is particularly true when it comes to programming AmigaDOS and you want to make sure you are working on the correct disk.

These variations just described rely on pre-loading the command before executing it. This is fine for commands you only need once in a while, but what about those in constant use? What is needed is a method which avoids all the constant disk swapping. Prior to AmigaDOS 1.3 there was only one method and, while it is a little clumsy, it is useful to know. The solution adopted in AmigaDOS 1.3 is better so I'll look at that one first.

All the AmigaDOS commands are stored in a special directory on the boot disk called C. At boot time this directory is given (assigned) a logical volume name of C:. Because of this, the AmigaDOS command directory can be accessed as if it were a normal disk volume, thus:

```
1>DIR C:
1>CD C:
```

Given this knowledge, you can make good use of a special command introduced for AmigaDOS 1.3. As its name implies, RESIDENT is used to pre-load copies of AmigaDOS commands into RAM. Once loaded

BLITS & BOBS

Processes are a special type of task which is able to access the dos.library and so, therefore, devices managed by DOS.

in this way, commands will stay in memory until you re-boot the machine. A typical synopsis for this command – making DIR resident – is:

```
1>RESIDENT C:DIR
```

It's important to note how you must specify the AmigaDOS command directory (C:) as part of the command line. This is so RESIDENT knows where it should load the command from. To find out which commands

GOT A PROBLEM JOHN?

Are you completely bogged down with any aspect of AmigaDOS whatsoever? Drop me a note detailing the nature of your conundrum: Mark Smiddy, *Amiga Shopper*, 30 Monmouth Street, Bath BA1 2BW. I'll do my best to lose it on my desk – er, figure out an answer that is. Sorry, but no personal correspondence can be entered into, no matter what you enclose (!)

already resident in RAM, you would type in the following code:

```
1>RESIDENT

Name        UseCount
DIR         0
CD          0
RESIDENT    1
EXECUTE     0
```

Notice how each command has a UseCount figure. This is defined by the number of processes sharing each command.

At this stage only RESIDENT is showing a value of one because the current (multi-tasked) process is using it; the other commands are idle.

Get on with it

Multi-tasking is just one of the things I'll be covering in-depth a little later in this series on AmigaDOS. For now, try having a go at experimenting with some of the commands in the C: directory and making a few resident. Next month I'll be taking a good look at copying and disk housekeeping with AmigaDOS. AS

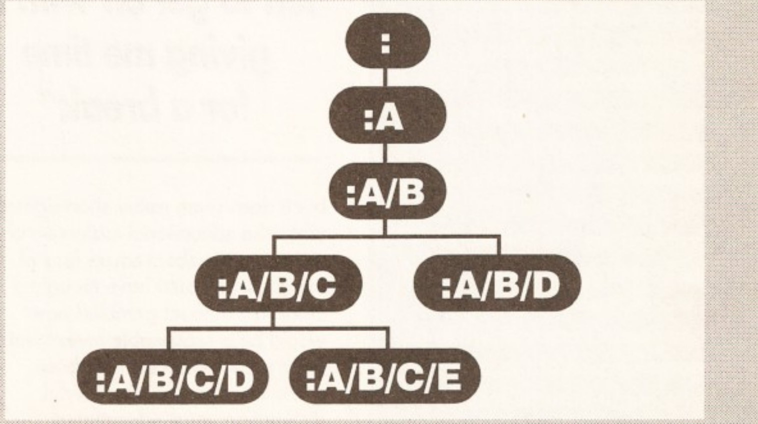
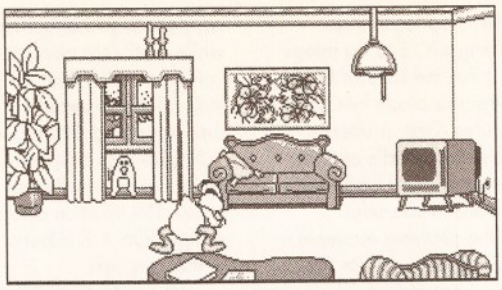


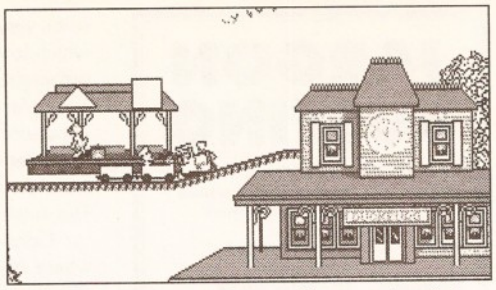
Figure 2: A simplified disk hierarchy showing paths. The root is shown by a colon. Note how directories in different parts of the tree can have the same name.



Disney characters Mickey and Goofy host a hidden number puzzle for the under fives.



"Now where did I put that letter?" Donald Duck presents an alphabetical poser or two.



Goofy's Runaway Train provides a colourful way for youngsters to learn about shapes

Teach to your own

Pat Winstanley sets our regular education column firmly on its feet with a mum's-eye-view of kids, Amigas and educational software

As the mother of two lively boys I have found several different ways of using the Amiga with the children for both their benefit and mine. I'm not too sure whether the Amiga gets much out of it though. Over the last few years we have found plenty of educational software around although it has often been a matter of scouring the small ads to find suppliers. We have also found a good deal of software which is not promoted as educational but ends up doing the job anyway.

While the market for educational software is vast, with a high proportion of households now owning a home computer of some description, the larger software houses and distributors seem reluctant to take the plunge. This might be due to the long shelf-life and hence slow turnover of the products, but it does seem rather short-sighted when the educational customers of today are the shoot-em-up fans of tomorrow. I would have thought a moderate amount gambled now would be a reasonable investment to build up a future customer base.

> *"Once little fingers know what to do, they can be safely left to get on with it, giving me time for a break"*

In the absence of powerful distribution, most educational software comes from small concerns, often one man bands, so you will have to do some searching to find what you need. ESP is a good first source as it stocks a wide range of titles as well as producing some of its own. Another place to look is Rickitt Educational Media which supplies software for virtually every computer. The list is mainly for the BBC since that is what most software has been written for, but a good selection of Amiga titles is stocked. Addresses for both these dealers are on page 89.

Amiga babysitter

There are three main reasons for involving children in the computer. First there is a wealth of software covering all aspects of education, from pre-school right through to adult education. Second, many games benefit from a second player which means I can pinch the children as opposition. Third, the Amiga makes and excellent babysitter. Once the little fingers know what (and what not) to do they can safely be left more or less to get on with it and give me time for a break.

Having noted earlier that the big boys ignore educational software, two exceptions are Electronic Arts which handles a few titles, and Database which has even had kid's titles in the Gallup charts alongside arcade games. Of the educational software tested and played for fun, by far the most popular has been Database's *Fun School* series, with its wide variety of age ranges and subjects. We have found quite a large overlap in the age ranges. Philip and Jamie are seven and six, so fit nicely into the middle of the

First Choices

With such a lot of software about, if you've never seen any what should you choose? Our Shopping List on page 89 gives items representative of the genre and, in some cases, top class. Initially I would plump for a pack that consists of a variety of topics. Then you can judge which areas need further work, perhaps at a lower level, and which ones the child is coping with easily and so would benefit from something of a higher level.

Remember the list's age guidelines are just that – don't treat them as gospel. It all depends on your child's skills and how he or she is 'grabbed' by the software. The best program in the world is worse than useless if your child doesn't enjoy it, while a poorer version of the same thing might become instantly addictive and be of some use without putting the child off.

KIDS VERSUS COMPUTERS

Amigas have a distinct aversion to mud, crumbs, Coke, jam, chewing-gum and other assorted nasties – unfortunately kids don't. In order to prevent your babies damaging each other in either direction here are a few ground rules to lay down.

1. **NO kiddies' drinks should be placed anywhere near the computer equipment EVER.**
2. **Keep your own coffee out of the way too. Kids are indiscriminately clumsy when excited.**
3. **No switching power on or off without proper supervision or adequate training.**
4. **Ensure the drive light is off before changing disks.**
5. **Make sure the children's hands are washed before allowing them to touch the equipment.**
6. **No wrestling the joystick or mouse away from each other.**
7. **Take turns choosing games.**
8. **Don't poke anything in drives or sockets.**
9. **Take it easy – press, don't hit keys.**
10. **No sneaking downstairs while Mum's still asleep and messing up her *Captive* saves.**

continued on page 89

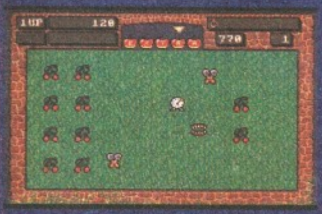
AMOS did all this... and much more!



Cartoon Capers: Hilarious paw to claw fighting game with attention-grabbing digitised sound effects [Available soon]



AMOS Paint: A feature-packed art program with fast zoom function and amazing flexibility [Available soon]



Mouthtrap: Super-fast and super-playable arcade-style game with cleverly animated cute graphics [Available soon]



Reversi: A stunningly presented Public Domain version of the classic Othello game with smoothly rotating counters.



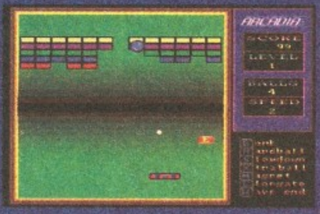
Jukebox: Plays a selection of music files with colourful, animated Vu-meters and spiralling logo [Public Domain]



Treasure Search: A Public Domain educational coordinates game for over 5s with amusing digitised speech.



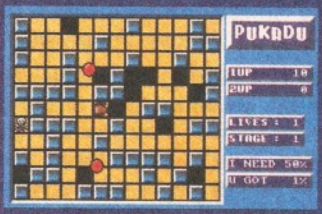
SkateTribe: Super-fast vertically scrolling skate game with bags of playability and captivating music [Available soon]



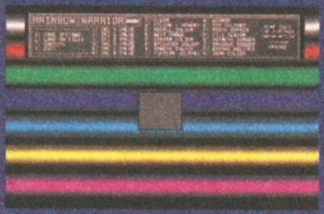
Arcadia: Breakout at its best – with a colourful copper list backdrop and a built-in level designer [Public Domain].



Xerxes' Revenge: Adrenalin-pounding, fast-action horizontally scrolling shoot 'em up game [Now free with AMOS]



Pukadu: Cute arcade-style strategy game with that professional touch to keep you playing [Shareware]



Rainbow Warrior: A very impressive editor which enables you to create copper list backdrops [Public Domain]



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There's also a rapidly expanding Public Domain library with more than 50 discs available (*contact: Sandra Sharkey, 25 Park Road, Wigan, Lancashire WN6 7AA. Telephone: 0942 495261*).

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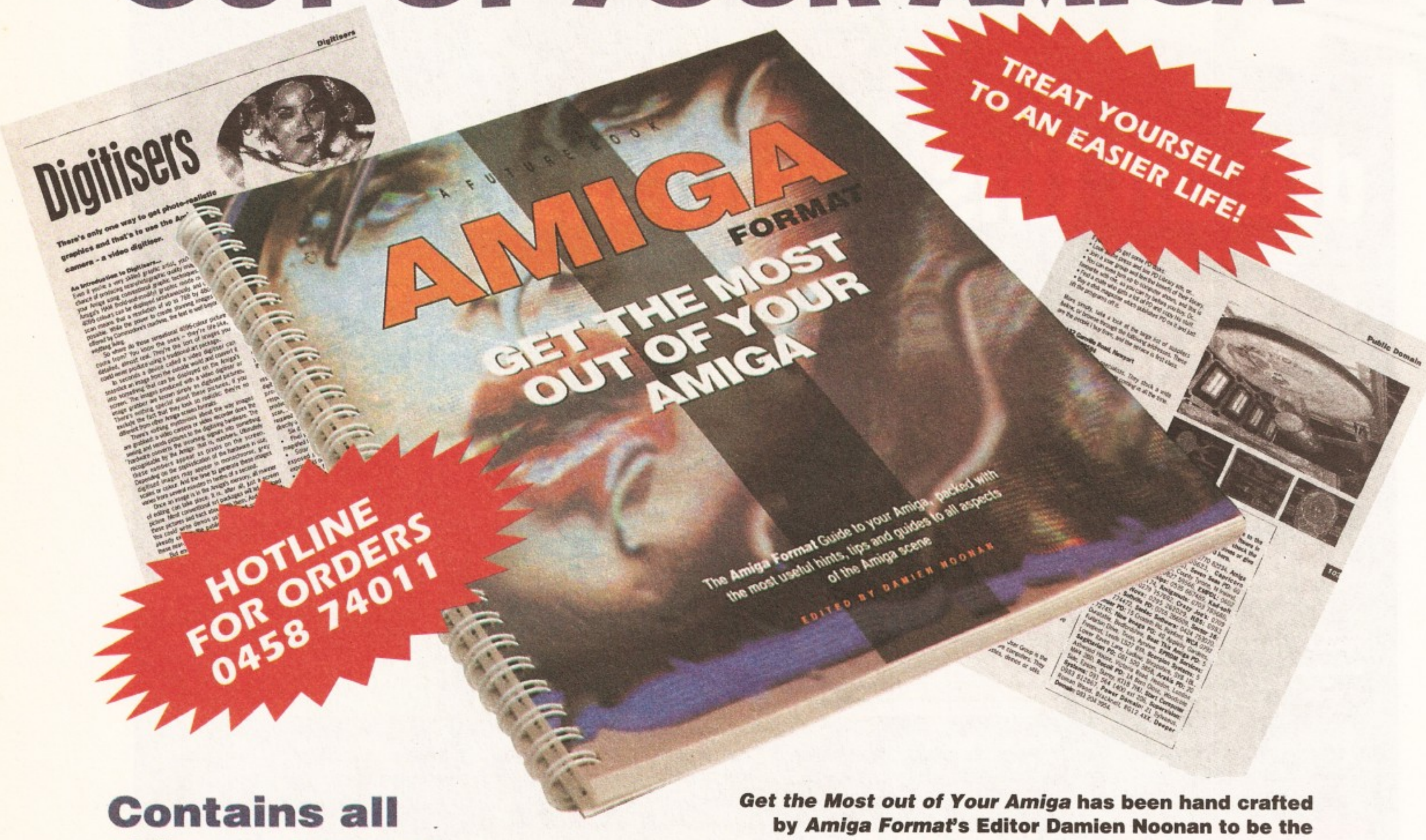
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continued from page 84

range (five to seven) but both have a great deal of fun with the under-five and over-seven packs too. As with any educational aid, don't take the quoted ages too seriously. Your child might well enjoy software aimed at younger or older child.

Learning at play

Although children like using the plainer software at school, when they come home they prefer to play games. As a parent I try to look out for games with a good educational content hidden out of sight to avoid the "Boring – I want to play games" syndrome. One of the better programs we discovered recently is written in AMOS and is PD. *Pick-up-a-Puzzle* is a jigsaw generator and had them absorbed for hours. At its simplest level it is far from easy, but they were determined to cope by themselves so who am I to complain?

"But jigsaws aren't educational", you may be saying. Oh yes they are. They teach concentration, logical thought, shape matching, perspective – need I go on. All these skills are essential for studying any subject and what better way to acquire them than without even realising? If you look hard enough you will find aspects of all sorts of games that teach parts of the National Curriculum while the kids think they are zapping aliens.

Another game that has taken over my computer is *Captive*. After watching for a while, both the children quickly figured out what was going on and became my eyes, ears, mappers and puzzle solvers. Jamie in particular had to be given his own save disk to keep him off mine. Although there isn't a sum or spelling in sight, the boys are learning direction finding and mapping techniques – exactly the subjects covered in some of the *Fun School* games. There is also a good deal of observation and deduction involved – does that gun shoot high or low, how far can I throw this, where was that power point I passed a while ago so that I can recharge?

Answering back

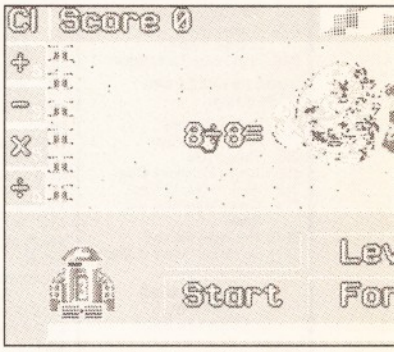
However much they like games, children still enjoy the more traditional educational styles. Software that simply presents sums on screen and asks for the answer is hugely popular, especially if several children are playing together. I find that even when they are supposed to be competing, they help each other out as much as possible. Sometimes the older children don't give the younger ones time to think before yelling out the answer, which can be a bit frustrating for the little ones. Mind you, that can easily be fixed by making the older children play at a harder level – it soon teaches them – they either behave or give up.

Perhaps most popular of all are the hybrids – educational programs jazzed up by the use of cute characters, storylines or animation. The *Puzzle Book* series is a good example of this. One of the games is actually a variation on Hangman but instead of the execution, Buddy the caterpillar blows up a balloon every time a letter is guessed wrongly. Once the room is full of balloons they all burst one after the other with delightful pops. The only drawback is that the 'failure' animation is far more satisfying to watch than that provided for 'success', which tends rather to defeat the object.

Another firm favourite is *Hooray for Henrietta*, which sends the heroine on a rescue mission answering maths questions en-route. Unfortunately this is another 'failure more spectacular than success' jobs as a parrot drenches Henrietta's hapless boyfriend if she doesn't reach him in time. Hilarious, but not much incentive to the children to get the right answers.

Rather too young for my brood but greatly enjoyed by the next door 20-month-old is a set of games based on Disney characters. The easiest (which was well within the baby's capabilities) is *Goofy's Railway Express* where the only control needed is pressing the space bar. Admittedly the space bar was around three inches deep, judging by the child's aim, but she had lots of fun. The game is like an interactive cartoon in which Goofy drives a train around the countryside. On the way shapes are puffed out of the funnel which, when the spacebar is pressed, transform into items of scenery. Since the items formed are related to both the colour and shape it's an excellent game for pre-schoolers who are just coming to grips with those topics.

> ***"I was surprised at how quickly children of all ages grasped the basics"***



Budding astrophysicists can learn their sums while finding out what space looks like.

I tend to receive quite a lot of educational software to look at covering all age groups, so it's just as well that the neighbours are a prolific lot when it comes to the pleasures of life. The summer holidays quite often see me with a houseful of eager testers, aged from three to fifteen, grouped around the various computers. At first the older ones were rather sceptical about a 'Mum' knowing computers, and more anxious to show off their joystick prowess than take the programs seriously. That was until they realised that the little ones were just as quick as them on games that took thought rather than reflex. I didn't snigger at their embarrassment – much.

Quickly literate

Considering that the local school doesn't have an Amiga (why not?), and the most of the local households have Spectrums or Nintendos at best, I was surprised at how quickly children of all ages picked up the basics of loading, saving, disk handling and all the other essentials. With so many undisciplined fingers around some ground rules were set down for protection of both children and computers, but once these were understood I could stand back and let them get on with it – all teaching and helping each other. The fact that the same set of children had had a running battle in the street the previous day seemed quite forgotten. If you baulk at the idea of letting kids loose on your precious machine, don't worry. Blame for all the accidents we have had with software or hardware can be laid firmly at my door – the children haven't damaged a single thing. AS

Shopping List

PRE-SCHOOL:

***FUN SCHOOL* (under 5) £24.99**
Database
Six different games covering counting, letters, shapes, action words, colouring and object words.

DISNEY (2 – 5) ....£24.99 each
Entertainment International
0268 541212
Goofy's Railway Express (shapes and colours), *Mickey's Runaway Zoo* (numbers) or *Donald's Alphabet Chase* (letters) – hilarious to watch – for once adults won't get bored sitting with the babies.

PRIMARY:

***FUN SCHOOL* (5-7) £24.99**
Database
Six offerings for the older child covering arithmetic, time, direction finding, circuits and a retrieval only database.

PUZZLE BOOK £19.95
ESP
Another set of six, this time more logic problems than the three "R"s. Adults and older children will be left scratching their heads with some of these.

EDUCATION SUPPLIERS

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Adlington Park, Adlington
Macclesfield SK10 4NP
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Scetlander Software
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Glasgow G12 8BR
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☎ 0626 331464

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Electronic Arts
Langley Business centre
11-49 Station Road
Langley, Berks
☎ 0753 49442

AMOS PD Library
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Wigan, Lancs
☎ 0942 495261

Rickitt Educational Media
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U32 Clight
U34 Amiga M.CAD V1.2.5
U29 Protracker
U24 New Amiga Sample Player
U23 MED V2.01 - Music Edit
U11 NASA backup disk
U18 P-Copy 3
U26 Midi utility disk
U39 New 8 track soundtracker
U37 Sound/noise/startra (2 disks)
U27 Video progs (2 disks)
U31 Copiers 1
U40 Noisetracker V1.1+
U22 Visicalc - Spreadsheet

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Z103 Pick Up A Puzzle (1 Meg)
Z110 Cross Fire (1 Meg)
Z130 The Wodern Ball (1 Meg)
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Z137 Tile Trile (1 Meg)

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Bruce Smith and Mark Smiddy take a two-volume approach in their attempt to explain the workings of AmigaDOS. With 688 pages of in-depth information, the tomes make a mighty read. But do all those words and all that paper add up to £40 well spent and, perhaps more importantly, do they a programmer make?

Mastering AmigaDOS2 Volume 1

There are several books available that attempt to explain the usage of AmigaDOS from the shell. Most of these offer a short tutorial on operating system basics and then give an alphabetical listing and description of the commands available. If you are lucky, an appendix is included which explains error messages in such illuminating terms as: '103: insufficient free store – you don't have enough physical memory on the Amiga to carry this operation out'.

This rather terse arrangement is only of use to those already well-versed in operating system lore. Beginners will find the tutorials too brief, and what is the point of an alphabetical listing of commands if you don't know the name of the command you want?

Pump up the volume

Smith and Smiddy's offering overcomes these problems by being split into two volumes. The first is essentially a tutorial that explains the various concepts involved and how they work together; the second is a reference work, consisting primarily of the afore-mentioned alphabetical listing of commands.

Volume one, although intended for beginners, is anything but skimpy. Its preface sets the tone for the whole book: lively, unpretentious, unpatronising, encouraging. The authors stress the importance of experimentation, pointing out that everyone begins as a beginner, and make a sideswipe at computer academics for their lack of imagination and sense of wonder.

The book proper begins by outlining the distinction between AmigaDOS and Workbench, followed by the obligatory explanation of directories. There is a chapter devoted to formatting and copying, then comes a description of how commands are entered and edited from the Shell.

Each chapter introduces new possibilities for using AmigaDOS. Differences between the versions (including AmigaDOS2) are always pointed out, and often separate examples are given for each. The examples themselves are excellent, being highly practical and clearly explained. For example:

"Consulting Volume Two, you will find that PROMPT does not have a command template, but it takes a new prompt string as an argument. What we need to do therefore, is supply the argument from a variable. In AmigaDOS2 this is simply:

```
1>PROMPT $variable
```

Neat, clean and easy. We will look at some more AmigaDOS2 specifics shortly, but what about applications that must run under AmigaDOS1.3 too? The command string looks like this:

```
1>PROMPT <ENV:variable
>NIL: ?
```

We know ENV: normally lives in the RAM disk, but it could be anywhere in theory. Using the ENV: logical assignment ensures we access the right directory. The filename will be the name of the variable.

The clever bit is triggered by the '<' redirection operator. This forces the command to read its line input from a file. This can be any file – but in this case it is an environmental variable. However, the command will only read its command line "interactively" if the '?' operator is specified. This also has the effect of triggering the command to display its help template – so we sink this to NIL: using '>NIL:'."

As can be seen from the example , occasional references are made to volume two and, though it is not necessarily required, some sort of reference work for the commands most certainly is.

Filing commands

The heart of the book is concerned with scripts. Most of the preceding chapters explain concepts necessary to an understanding of scripts, and it is clear that the greatest power can be got from AmigaDOS by their use.

Simply, a script is a file containing a sequence of AmigaDOS commands. Just as the typing of an

continued on page 92

continued from page 91

AmigaDOS command results in it being loaded from disk and executed, so too with the typing of a script's name. But in this case, rather than machine code the file contains strings of text, each string representing a command which in turn is loaded and executed. So scripts give the user access to an interpreter similar to Basic.

What's the point?

There are some problems with this. Why should someone write a program using an AmigaDOS script when they could probably write it more efficiently in C or assembler? Unix, to which AmigaDOS owes a great deal, offers a lot of small programs that the user can join together from within a script to create custom applications with ease. But Unix is far more powerful than AmigaDOS and tends to run on much faster machines. It might be argued that since scripts are interpreted rather than compiled, they are easier to write and debug. Yet the syntax of AmigaDOS is hardly intuitive, or even consistent, and the error messages are less helpful than those of the most terse compiler.

Although the authors do not address the question directly, there are some advantages. For instance, operating system functions can be executed by typing the relevant command, whereas from C, all sorts of libraries have to be opened and complicated structures created.

Having decided that you do want to program using scripts, you will find the book very useful. It deals with this confusing topic in great detail. From basic principles the reader is led carefully onwards to the creation of intricate programs. The authors are justifiably proud of some of these. Many are scripts which write their own scripts; there is a chapter devoted to those using recursion. Although impressive, it is doubtful that anyone but a programmer could appreciate their power. They are certainly useful, but their uses may well strike the beginner as trivial. In the following quote, taken from the chapter on recursive scripts, the authors introduce a script that creates and executes its own script:

"This is another of the support scripts that we have devised to bridge the gap between AmigaDOS1.3 and AmigaDOS2. It's a very apt demonstration of recursion at work – although only a few lines long it can examine every file and every directory on a hard disk. It can be improve of course, but for this example we wanted to show how much recursion can do in a few short lines. This apparently simple script undergoes some very complex looping, so we'll leave the fancy bits for later...

The authors then present the six line line script and explain the meaning of each line. It's clever, but a beginner might well wonder why such a convoluted method is needed to do so something as simple as listing the directories and subdirectories on a disk.

BLITS & BOBS

A bunch of BBC engineers trying to display a certain data file found the screen filling with little green smiley faces. After much running to and fro screaming "Virus!" it turned out to be nothing more than a corrupted data file full of the ASCII value for the smiley face character.

The example scripts are available, along with a number of PD utilities, on a disk for £1. This saves you fromb typing them in and introducing almost untraceable errors.

The most common script on the Amiga is the startup sequence, executed every time the system boots up. This has a chapter all to itself, where the meaning of every single line is explained and customising it is discussed. Another chapter deals with the possibilities available with AmigaDOS2.

All this, and additional chapters describing such things as devices and the Amiga's text editors, make this one of the most comprehensive and lucid books available on AmigaDOS. But who is it for? The beginner will struggle and probably flounder. It is unfair to expect an operating system manual to teach programming, but knowledge of programming is required for an understanding of much of the book. The ideal reader, then, would be a new Amiga user with some previous programming experience, or one with an additional programming manual and a strong desire to learn.

Volume 2

The second volume of Mastering AmigaDOS2 – 48 pages and £4 less than Volume one – is a straight-forward reference manual to every command available under versions 1.2, 1.3, 1.3.2 and 2 of the operating system.

It is complete and almost entirely correct except for those 2 commands which were, at the time of publishing, undocumented; the authors have described these few commands as best they can, pointing out that things might have changed by the time System 2 is finally unleashed.

Where commands might warrant examples, in many cases the reader is referred to the relevant chapter in the first volume. But the explanations of all the commands except Ed, for which Volume one is needed, are clear and comprehensive.

Volume two is padded out with a few appendices discussing error codes, viruses, IFF and the mountlist.

The IFF appendix, which has been adapted from an article originally published in *Amiga Format*, is particularly advanced and requires a knowledge of assembler and C to understand; it doesn't really go far enough to be of use to a programmer and is far too complex a subject for novices.

Appendicular virus

The appendix on viruses, on the other hand – which has also been adapted from an article originally published in *Amiga Format* – addresses a problem that all Amiga newcomers eventually come across. Because of the masses of news coverage given to viruses which have attempted to infiltrate large important computer systems, like the one at NASA, many beginners begin to panic blindly at the merest hint of a virus, usually without any good reason.

Volume two of *Mastering AmigaDOS2* describes concisely what a virus is and, more importantly, what it isn't, plus it lists the various strains of virus you are likely to get infected with and what the signs of infection are.

A short section describes how to protect against viruses. I would argue that this volume is the more useful of the two. The command descriptions are extensive where they need to be – List, for instance, takes up seven pages, Resident takes up six – and a little experimentation with the more advanced commands will probably teach you more than any tutorial book can hope to.

On its own, at £17.95, it is about par for the course as far as the price of books on AmigaDOS go, although a fair amount of it – 45 new or enhanced commands out of 92 in total – will be of limited use to Amiga 500 owners who, according to current sources at Commodore, will not be seeing AmigaDOS 2.0 released for their machines. AS

THE SHELL EXPLAINED

The shell (or Command Line Interface as it was known in its earlier incarnation) is a text-based method of communicating with the Amiga, similar to that used in MS-DOS or Unix, which side-steps Workbench's graphics interface. Instructions are sent by typing the command name, followed by a list of options specific to the particular command. The vast majority of AmigaDOS commands are stored in the C directory of the system disk. They are loaded into memory and can be executed as required.

Of course, clicking on Workbench icons results in this same loading and executing of commands, but an additional layer of interpretation – Intuition – has to be gone through first. Also, a listing of the C directory will show that there are many more commands available than there are menus and icons on the Workbench. Obviously, using the shell has some advantages.

Many users of the Amiga, content to click on icons and open drawers as required, are probably in the dark as to exactly what a disk operating system is. Most are probably happy to remain that way. But while using the Workbench, the average user can carry out all the disk activities he or she is likely to require, there remain many commands and options available only from the shell.

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40/80 track	No	No	No	No	No	No	No	Yes
Height (mm)	50	35	32	66	46	32	22	52
Width (mm)	135	116	107	107	143	103	115	148
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Anti click	No	No	Yes	Yes	No	No	No	No
Build	Good	Good	V Good	V Good	Good	V Good	V Good	V Good
Casing	Plastic	Plastic	Metal	Metal	Plastic	Metal	Metal	Metal
Fixing	Screws	Clips	Screws	Screws	Screws	Screws	Screws	Screws
External finish	V Good	V Good	Good	Good	V Good	V Good	V Good	Good
Repel solvent	AC	ABC	ABCD	ABCD	ABC	ABCD	ABCD	ABCD
Repel fire (30s)	No -1	No -10	Yes	Yes	No -15	Yes	Yes	Yes
Repel scratches	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Repel liquids	No	Yes	Yes	-	Yes	No	No	No
Repel dust	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Extreme stress	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
Pull breakaway (g)	400	800	400	1,600	1,000	1,000	600	2,600
Pull running (g)	400	200	400	1,400	800	1,000	400	1,800
Mechanism	Int	Ext	Ext	Ext	Ext	Ext	Ext	Ext
Eject throw (mm)	7	2	2	7	7	2	6	-
Eject pressure (g)	600	700	700	600	800	700	800	-
Price	**£99.99**	**£74.99**	**£65**	**£110**	**£84**	**£65***	**£65***	**£99***

* These prices may vary greatly depending on the supplier and badged name.

Summary of Test Criteria

THROUGHPORT: Throughport compatibility test determined if drives from different manufacturers could be connected to each other

REPEL SOLVENT: Four different solvents and bleaches commonly found in the household environment were used, ranging from 'A': a mild bleaching agent to 'D': a powerful solvent. Five ml was applied to the case and allowed to stand for 20 minutes. The cases were then cleaned, dried and inspected for damage. A letter here indicates a pass.

REPEL FIRE: A yellow flame was played on the casing for 30 seconds or until the surface showed visible signs of damage. It was known that the plastic cases would not survive; the figure shows time recorded before blemishing.

REPEL SCRATCHES: A sharp stylus was scraped along the drive's casing until the covering became perforated. All of the drives reviewed performed more or less equally.

REPEL LIQUIDS: 300 ml of damn fine hot coffee was poured over the drive casing. A pass indicates that although liquid entered the case, it did not touch any sensitive components. The test was not conducted on Power Computing's dual disc drive as it is mains powered and would have frazzled our reviewer. Don't try this at home kids!

REPEL DUST: A known amount of fine powder was sprayed directly at the drive door under slight pressure. A fail indicates that more than 20 per cent of the powder entered the mechanism.

EXTREME STRESS: First, the drive was swung pendulum-fashion by its lead. Second, a large man stood on the casing. A passindicates that the case did not crack.

PULL BREAKAWAY: The force (calculated as weight in grammes) required to start the drive moving across an arbitrary surface when tugged by its lead.

PULL RUNNING: The force required (calculated as weight in grammes) to keep a drive moving across an arbitrary surface when pulled along by its lead.

EJECT THROW: The amount of eject button protruding when a disk has been inserted.

EJECT WEIGHT: The amount of force required to eject a disk using the eject button.

This buyers' guide is compiled from the comprehensive survey conducted in the free sample issue of *Amiga Shopper* given away with issue 21 of *Amiga Format*. We have included as much information as possible to help you make your buying decision. For a fuller analysis you should purchase the relevant back-issue of *Amiga Format,* with the sampler attached, from our subscriptions address (see page 114).

This page will be updated whenever necessary and if you are aware of any inaccuracies or omissions from the guide then please notify us in writing so that we can correct them. AS

AMIGA SHOPPER BEST BUY

POWER DUAL DRIVE

Quite simply, the best all-rounder. The internal PSU means no strain on the A500's power unit. The double-deck configuration is cost effective – cheaper than two singles. Not quite as attractive as the Roctec or Cumana singles, but still looks good on a desktop.

AMIGA SHOPPER BEST BUDGET BUYS

ROCTEC RF302, RF332 AND POWER SINGLE

All these can be picked up for £60 or so. Strong construction, good design and durability make them the obvious choices – not forgetting the Power drives' anti-click feature.

Drive Suppliers

When you make your choice where do you go? The first stop will probably be your local dealer, but few dealers stock the drives listed here – at least, not under their own names. Many distributors now value-add to third-party disk drives by packing them in fancy boxes and giving things away with them. This is in evidence with the Roctec units, which we believe are badged as Qtec (from Trilogic on 0274 6911115) and Xetec. There's nothing wrong with this, but it helps to know what you are buying. If in doubt, get the dealer to open the box and have a look.

Drives most commonly found at local specialist dealers tend to be the ever-popular Cumana models, whereas those sold by mail-order firms are usually made by Power Computing. If in doubt, ask.

Roctec units are more difficult to find in native form. Anyone interested in getting one of the slimline models can contact their importer Direct Disk Supplies.

The Commodore A1011 is freely available; any Commodore appointed dealer will either stock them or be able to order them. However, you should not contact Commodore directly.

CUMANA:
Pines Trading Estate, Broad Street, Guildford, Surrey G3 3BH ☎ 0483 503121

GOLDEN IMAGE
Golden Image House, Fairways Business Park, Lammas Road, London E10 7QT ☎ 081-518 7373

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Unit 19, Teddington Business Park, Station Road, Teddington, Middlesex TW11 9BQ ☎ 081-977 8777

POWER COMPUTING
44a Stanley Street, Bedford, Beds MK41 7RW
☎ 0234 273000

AMOS action



This month Phil South helps you to create top quality music scores for use with AMOS and at a PD budget

Welcome to the AMOS column, the place where every month you can find tutorials and lots of hints and tips for use with Mandarin Software's *AMOS Basic Interpreter*. AMOS is a powerful extended Basic and was created by the writer of *STOS* for the ST (ptui). Sorry about that.

To start us off this month I'll be helping you create your own music scores to replace those supplied with the AMOS program. Okay, so the tunes you get are very nice, but it looks and sounds much better if you do your own. This is not as hard as it sounds and to prove it I'm going to let you into a few trade secrets to show how to get the best tunes for the least effort. And I'll be giving the usual host of hints and tips from my many years of BASIC programming experience. *(Bighead! – Big Ed.)*

> **"The really neat thing about AMOS is that it can accept tunes and samples from a whole variety of sources"**

Anyway, let's tackle some of the underlying principles behind AMOS – things you don't find in the manual without a magnifying glass.

Banking resources

One of the reasons that AMOS looks and sounds so brilliant is that it stores things like music and graphics in special banks of memory and, when saving your program, these are saved with it as invisible resources for the program to use. So for instance you would go to direct mode and load the .abk files for sprites and music, then go into the editor and tap in your program. If you just typed in a program which had music and graphics files in it from a magazine without those all important .abk files, then the program would bomb out with a 'music file not found at line 1' message or similar.

The naked listings do nothing without the invisible graphic and sound files attached to them, which is why you will rarely see AMOS listings in magazines. Music and graphics are created in other packages and then converted to .abk files for use with AMOS. In the case of music, the packages concerned are *Soundtracker, Noisetracker, Sonix* and *Game Music Creator (GMC)*. Converters are supplied with the AMOS package to convert these into the special .abk files.

Tuning up

The really neat thing about AMOS is that it can accept tunes and samples from a variety of sources. But a lot of people are still using the preset tunes that come with the program. It may seem at first glance that original music is hard to create, but in actual fact the problem is halved if you know a bit about the music programs and how they work.

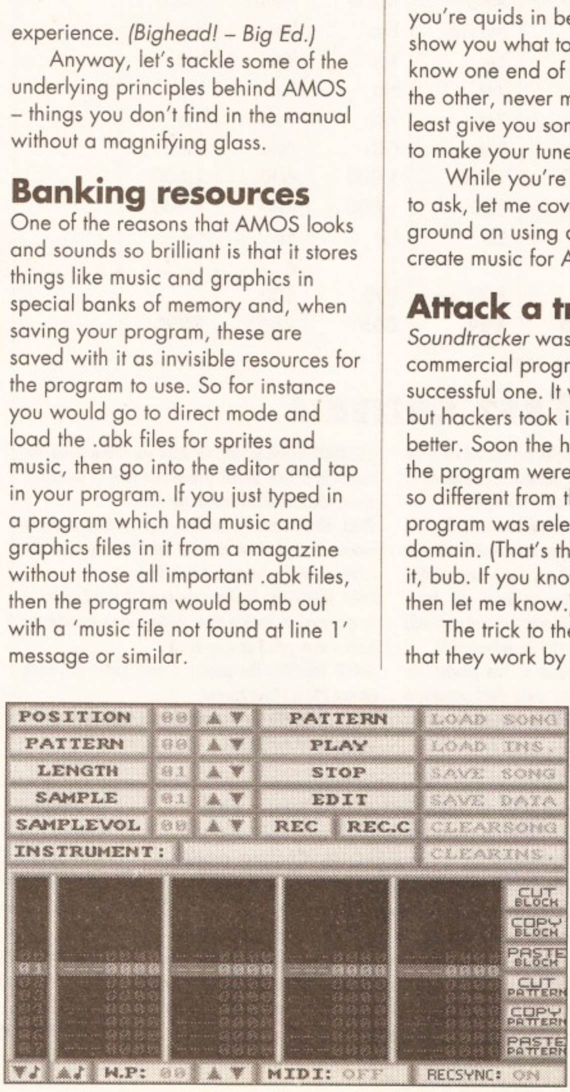
Before you try doing your own music, it might be an idea to hunt around for an Amiga chum who is a bit of a musical whizz. If he/she uses one of the tracker programs, then you're quids in because they can show you what to do. If they don't know one end of a soundtracker from the other, never mind. They can at least give you some pointers on how to make your tunes more tuneful.

While you're thinking about who to ask, let me cover some of the basic ground on using a tracker program to create music for AMOS.

Attack a tracker

Soundtracker was originally a commercial program, but not a very successful one. It was good alright, but hackers took it apart and made it better. Soon the hacked versions of the program were so much better and so different from the original that the program was released into the public domain. (That's the way I understand it, bub. If you know any different, then let me know.)

The trick to these tracker things is that they work by setting the music



Game Music Creator **is a very simple to use music program. Samples can be culled from pretty well any source and played back with ease. A cost-effective way to tune up.**

Beat Box

Where there's music, you've got to have rhythm. A good beat can give your game pace and provides a useful basis from which you can write your tune. Have a listen to some of the dance grooves in the charts and try to keep track of the individual elements of the beat.

Here's how easy it is to get a beat together with Soundtracker. The thing works on a 64-step beat, right? So:

1) Get a bass drum sound and a snare drum sound into the first two instruments by selecting the instrument on the sample buttons and pressing 'Use Preset'.

2) Then work out what kind of beat you want. Let's take what I would describe as a 'bog-standard backbeat' to start with. This is a rhythm that goes 'dum-chak-dum-chak' all the way through.

3) Depending on how fast you want the beat, divide up the 64 steps of the current pattern on a piece of paper into four or eight or sixteen chunks. That's 16 or 8 or 4 respectively.

4) Now put alternate bass and snare hits on every eighth or sixteenth step. That is to say, on step one put a bass drum, then put a snare beat on step nine, then a bass beat again on step 17, and so on.

5) That's the backbeat. Now on the same channel put a closed hi-hat on every step that doesn't have a snare or bass drum on it, except the last step which should be an open hi-hat. So basically you fill in all the gaps with the hi-hat cymbal making a nice drum track on the first channel. Note how the gaps in the hi-hat are unnoticeable because of the bass and snare.

down as 64-beat patterns, made up of four tracks which play all at once. You put the music into the 64 steps and play it by hitting the play button. The tracks scroll up the screen and any notes crossing the line across the middle of the screen are played. The notes are input from the keyboard on your Amiga, although some versions exist that accept MIDI input.

Tunes are made by writing short tunes, or 'patterns' as they are called, then organising those patterns into a song. So one pattern might be the intro, the next pattern might be a verse, the next a chorus, and so on. Patterns can be played any number of times and in any order, so you only need to create each pattern once. Then all you do is call up the pattern by indicating its number and its position in the song.

Although the ways you put your notes in the thing vary from program to program, the way to build a tune is generally the same.

Dum-de-dum-dum

Oh dear, now we come to the tricky part; how to make a tune. Well, start off with a simple bass riff on the channel next to the drums. One bass note on every other step should do it. Keep it simple and repetitive. Some of the most successful tunes are.

Now change to the third channel. Play the tune through and imagine what the next instrument should be doing. Think of a tune and play it, playing along with the bass and drums until you have it down. Then, depending on the

SNOUTY ROOTS FOR TIPS

If you have any hints and tips you want to send me, whack them on paper or a disk and send them to: Phil South, AMOS Action, *Amiga Shopper*, 30 Monmouth Street, Bath, BA1 2BW.

I got algorithm

Before you program something, after you've designed the idea and before you start coding, come up with an algorthim. Algorthims are a stage between English and computer language by which you can define the problem more closely and start setting up the procedures you will use and devise ways of cracking the basic problems of the program. To make an algorithm, divide the problem into as many parts as possible and give each a short name describing its use. This forms the basis of your subroutines and the main program driving them.

Aesthetic Indent

Make all your listings kinder on the eye by using the Indent function on the top menus. This tabs all the loops and stuff in a few spaces so that it reads more readily, and this can save a lot of problems when you come to edit the program. It also defines the shape of the program so you know at which bit you're looking.

Designer label

Make your label names descriptive of what the subsection of the program is doing. But be careful not to allow any reserved words – Basic keywords, that is – into your label names. If a label turns out to be a keyword, change it to something phonetically similar. For DEC you could say DEK, and for FOR you could say FOUR.

Inverted logic

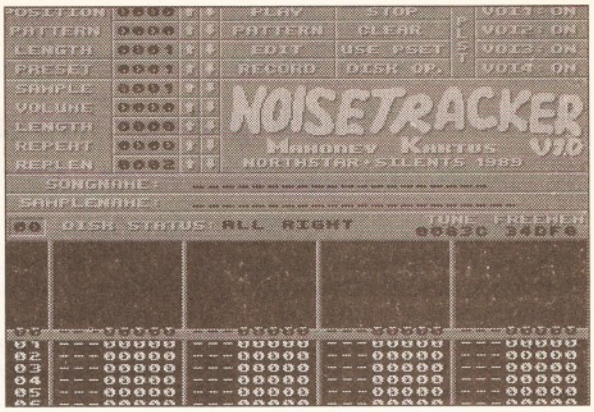
The file selector command in the original manual for AMOS has a typing error. The correct format for the command is not:

```
Print Fsel$(*.*)
```

but is in fact:

```
Print Fsel$("*.*")
```

The inverted commas are everywhere in AMOS in disk ops, so the above solution stands to reason really. If you get an error with a program that uses the file selector, try checking to see if this particular syntax error is the real problem.



***Noisetracker* is another very useful musical tool available in the public domain. It is based very heavily on *Soundtracker* and features impressive facilities for a freebie program**

soundtracker, you can either put it in step by step or even play it live.

The trick to playing tunes if you're either not very musical or just tone deaf is to keep it simple. The simplest, silliest little tunes can be the least heavy on the ear. And remember, the tunes should be an accompaniment to the pictures, not the main attraction in themselves.

Think about the tune you want to play and hum it to yourself before you start banging the keys. Once you have a melody in your head, carefully find the notes on the keyboard. Then when you know how to play it, tap it into the soundtracker. Sounds simple, right? Okay, so it's a bit hard at first, but soon you'll be banging the tunes out like a demented Andrew Lloyd Webber ... err OK, not such a good example, but you get the gist.

BLITS & BOBS

The word 'algorithm' derives from the surname of redoubtable Persian mathematician, Abu Ja'far Mohammed ibn Musa al-Khowarismi. Try saying that with a mouthful of marbles.

Mods and rockers

On the AMOS disk there is a little program which lets you convert a *Soundtracker* or *Noisetracker* 'module' – that is the file containing the samples as well as the tune.

Most trackers will save the module as a file called "mod.<song>", and save them automatically into the modules directory on the disk. Some allow you to save them into a completely new directory, which can even be on another disk.

Once you have saved the module to disk you can then run it through the appropriate converter program:

```
GMC_To_AMOS.AMOS
Sonix.AMOS
Sound_tracker2_1.AMOS
```

Load it into AMOS, run it and you'll be asked to load a file for conversion. The whole process is automatic, and it handles all the most recent versions of the programs.

Time To Go

Okay, that's it. I know that soundtrackers can be erratic, but bear in mind that the great number of tracker programs are PD, and so aren't likely to be very stable or user-friendly. What do you expect from something that's free? Keep plugging away at it and you'll soon have more tunes than you know what to do with. See you next month when we'll be looking at the way AMOS deals with graphics and how you can create your own demos, plus the usual hints and tips. Be seeing you. AS

JARGON BUSTING

SAMPLE: **Digital representation of a sound consisting of a series of numbers relating to a sound-wave's amplitude over a period of time – typically ten or twenty thousand numbers for a one-second sample – sped up or slowed down to alter the sample's pitch.**

MIDI: **Musical Instrument Digital Interface: a standard adopted by electronic intsrument manufacturers involving a hardware link and a code for exchanging musical information.**

.abk: **This is AMOS's way of storing graphics and sound data. As it uses a different data format to the standard Amiga one (IFF), conversion programs must be used on sprites, pictures and music created with non-AMOS utilities before their inclusion in your AMOS program.**

ADVICE FOR AMIGA SHOPPERS

Whether buying over the phone from adverts in Amiga Shopper or at a local computer store, here's our advice on how to avoid problems.

BUYING IN PERSON

- Where possible, test software and hardware in the shop before taking it home to make sure it works.
- Make sure you have all the necessary leads, manuals or other accessories you need.
- Don't forget to keep your receipt.

BUYING BY PHONE

- Be as clear as possible when stating what you want to buy. Confirm all technical details of what you are buying. Bear in mind version numbers; memory and other hard or software requirements; and compatibility with your Amiga (which version of Kickstart you have?).
- Check the price to make sure it's the same as the one advertised.
- Check that what you're ordering is actually in stock.
- Check when and how the article will be delivered and that any extra charges are as stated on the advert.
- Make a note of the date and time when you made the order.

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As with buying by phone, when buying by mail-order you should clearly state exactly what it is you wish to buy, at what price (refer to the page and issue number in which the goods are advertised) and give any relevant information about your system set-up where necessary. You should also be careful to keep copies of all correspondence both to and from the company from which you are buying.

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Whichever method you buy by, you can return goods if they fail to meet one of three criteria:

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When returning anything make sure you have proof of purchase and that you do it as soon as possible after purchasing it. For this reason it is important you check the goods as soon as they are delivered to make sure everything you ordered is there and works as it is supposed to.

HOW TO PAY

Paying by credit card is the most sensible way, whether buying in person, by post or on the phone, because you may be able to claim the money from the credit company even if the firm you ordered from has gone bust or refuses to help.

Otherwise, pay by crossed cheque or postal order, but never send cash through the mail.

GETTING REPAIRS

When buying hardware, always check the conditions of the guarantee, servicing and replacement policy. Always fill in and return warranty cards as soon as possible and make sure that you are aware of the terms and conditions of the guarantee.

BUYING PD

Even though buying PD software is inexpensive, you should still apply the same rules of confirming all transactions as clearly as possible and keeping records of all communications.

Further advice on buying from PD houses can be found in the PD pages starting on page 105.

AD COMPLAINTS

If you have a complaint about one of the advertisers in *Amiga Shopper* then write to the Advertising Department, *Amiga Shopper*, 30 Monmouth Street, Bath BA1 2BW, stating as clearly as possible what the problem is.

We cannot guarantee to solve the problem and you should make every reasonable effort to sort it out yourself before contacting us. AS

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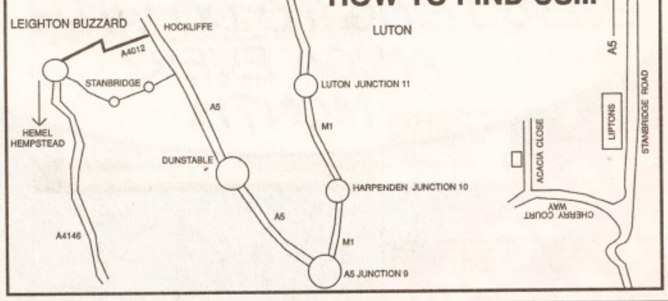
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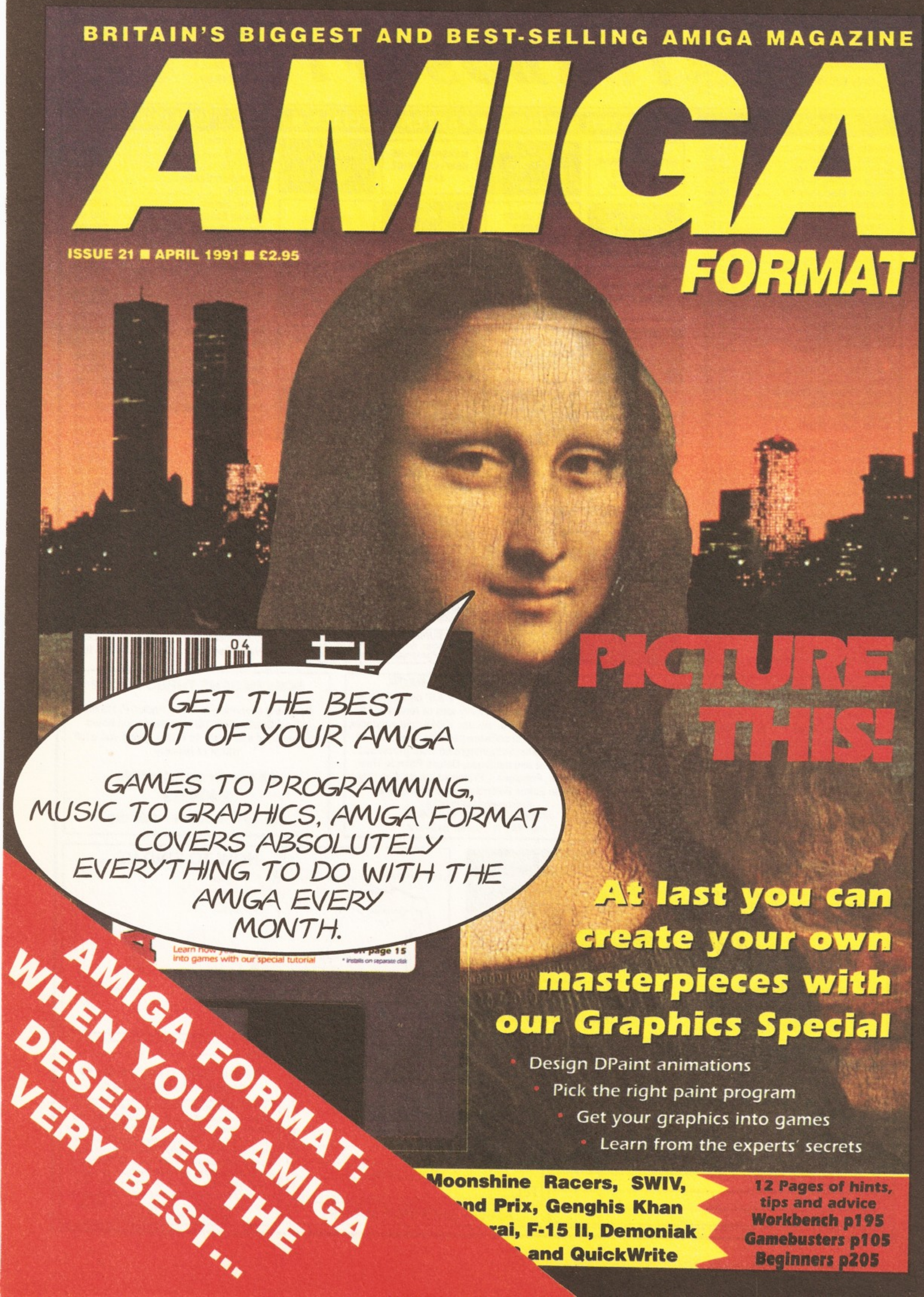
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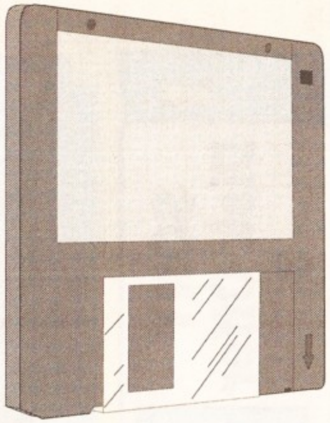
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BEGINNERS START HERE

Free software. Sounds like piracy, right? Wrong. Public Domain software is free to anyone. There must be a catch though surely? No there isn't, unless of course you count the fact that there is so much PD software that it's hard to choose what you're going to have first.

PD is a concept borrowed from early mainframe systems where hackers, as the original computer freaks were called, produced programs and distributed them to their friends and fellow hackers, asking for no other payment than recognition as a truly hackish dude. The copyright to the program was waived by the author and so the program was said to be in the Public Domain – that is any member of the public had a right to copy and use the program however they wished, provided that the author's credit and documentation was distributed with the program.

Since the rise in popularity of computers in the home since the late 1970s, PD has been nurtured by the use of Bulletin Board Systems (BBS) where anyone can log on, download a lot of demos and utilities, leave a few messages and log off. PD is good currency and you have only got to log on to find out just how much fun swapping and collecting PD can be.

What can you get? Here are just some of the things available from the many PD houses:

● Utilities: These are programs to help you use your computer. Some are just simple commands to use from the CLI, but others are complete menu-driven programs to compress files, convert them from one form to another or even to rescue broken disks. The best disks to look for are the collections of utilities with a

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Software for free

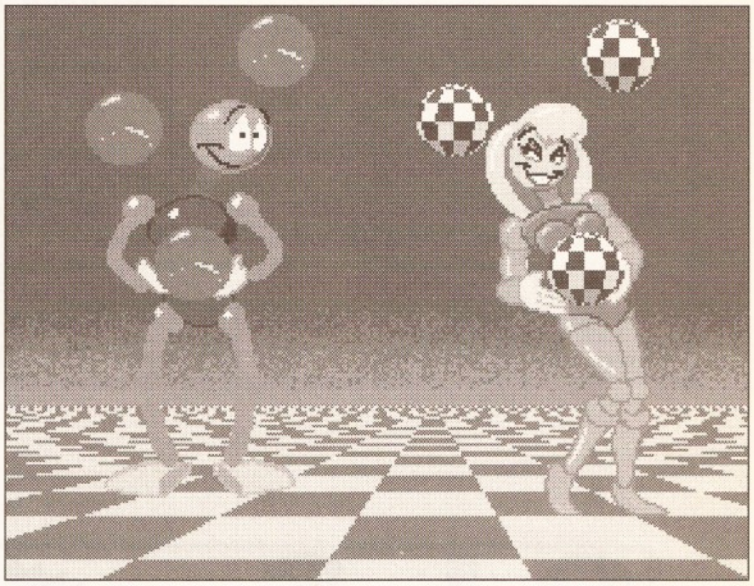


Phil South cordially invites you into the Public Domain – a wonderful place where all software is free and only the disks have numbers

We are all prisoners of our budget. So thank the Lordy for the many PD houses that distribute software written by individuals little concerned with looking after number one.

Amiganuts United is one such and specialises in utility and application programs, though it does have the odd disk of small addictive games. The quality of the disks is very good and overall most things I have received from Amiganuts have been very useful. It takes a sharp eye to separate the wheat from the tons of chaff in the PD market, and Amiganuts certainly has that skill.

Let's take a look at the sample swatch of disks they mailed me and see what it is, if anything, that makes this PD house special.



The *Juggler* develops a roving eye in his latest animated escapade, but watch out as he checks his mate in the final scene.

QUIZMASTER (disk 876)

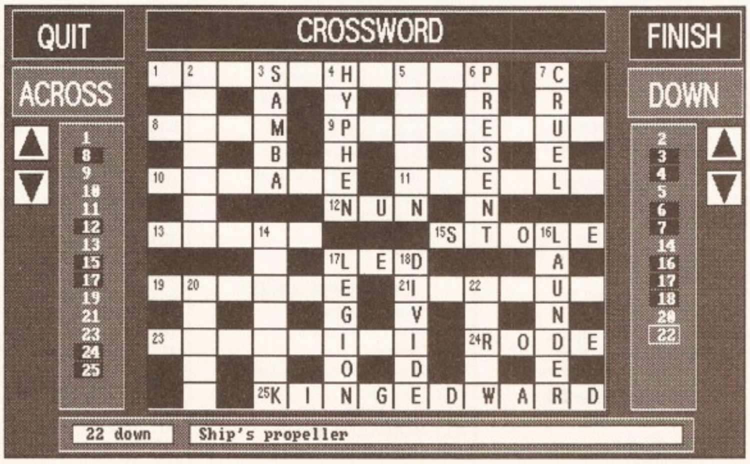
1 ACROSS, 2 DOWN (disks 877)

Trivia quizzes are ten a penny. In fact give me a couple of bob and I'll sell you a gross. *Quizmaster* and *1 Across, 2 Down* are both games written by KAG/SJP Productions using the AMOS Basic interpreter from Mandarin Software. Very professional they are too, but then everything written in AMOS is bigger than the sum of its parts because of the overdriven graphics and sound routines. Having said that, there is no sound in these games as you send a racing car up the screen by answering questions in one or solve the crosswords in the other.

The interfaces with the programs are slick, although gameplay is a bit lacking in *Quizmaster*. Mind you, the questions are hard enough to keep anyone going. I wouldn't say that the games are boring, just a tad slow. They are good as an AMOS tutorial and being AMOS listings you can load them into your interpreter and see how they work. Even so, as it is copyright material you cannot lift anything from it without permission.

One interesting point is that the programs are both Licenseware, so a percentage of the profit goes direct to the authors. This is a trend which will be quick to catch on, I suspect, with authors licensing their programs specifically to one PD house so they are ensured lower, but more frequent payments than they would receive through shareware.

Value for money 59/100
Commercial value 5/10



I couldn't find a cross word to say about Amiganut's *1 Across, 2 Down*, apart from its rather slow running speed and lack of sound.

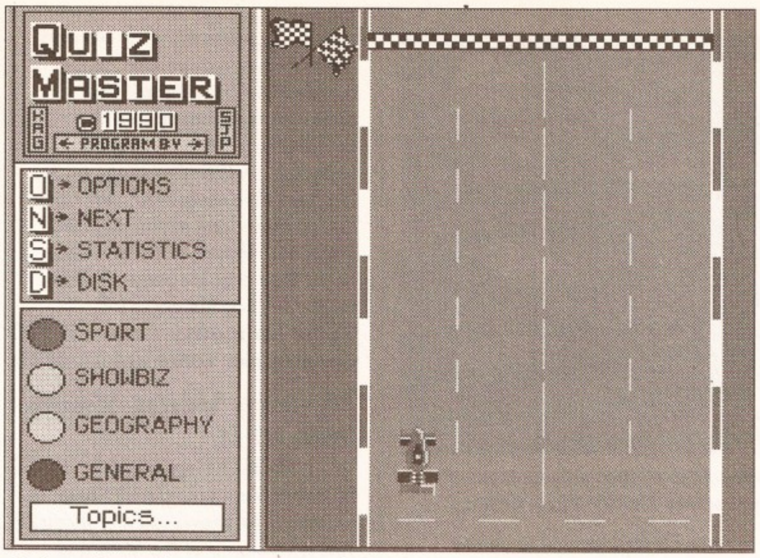
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selection of the best utils all squeezed onto one disk. Virus killers are probably the most useful, and the best thing about them being PD is that they are freely updated and distributed all the time.

- Applications: Some of the best programs are PD. *SID* for example is one of the best graphic interfaces for AmigaDOS, and it's PD, or to be more precise, 'shareware'. This is a branch of PD that you pay for, but the author lets you use the program to see if you like it first. Shareware isn't expensive because authors usually only ask for between £5 and £25 for their efforts. In most cases it's worth paying in the end, as you get free upgrades and documentation.
- Demos: This is the field of Amiga art, where a team of hackers – usually called a crew or team – get together and have a late night hack attack and create a dazzling demo of their programming abilities. Demo team members usually go on to be professional programmers, so their demo days are usually numbered. Scoopex and Silents are two of the best teams, and the likes of Kefrens are not to be missed. Imagine a cross between a dance record, video and lightshow and you're getting the idea.
- Game demos: In recent years, various major software houses have watched the PD area growing and noticed that people buy demo disks. So they release demos – sometimes playable demos – of their new releases, allowing punters to try the game before they buy. Demos of this kind usually turn up first on the covers of magazines like our sister mag *Amiga Format*, and then later the demos appear on their own in a PD library. A successful and popular demo translates into a very popular

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***Quizmaster* invites you to get quizzical with a bunch of tough questions and a rather slow racing car – probably the Ferarri gearbox playing up.**

TextPlus
(disk 832)

Text editors are distinct from word processors in that they are really designed for keying in the source code for your assembler, compiler or Basic interpreter. *TextPlus* can't really decide quite what it is supposed to be and the documentation is a trifle on the wacky side, probably because

> **"Text editors are good for entering text, but this program is not something you could bash out your letters on."**

it was written by the program's German author, I suspect.

The program itself is nicely presented, but I would argue that it does try to be a word processor when it fact it is nothing of the sort. Lots of the features are useful for programs but not for documents. Take the hyphenation control, called Auto-Div. This is programmed for some of the over-long German words that crop up frequently in the language (mainly because of the Teutonic habit of bolting two already long words together to form a new one). So because it is intended for German use, it gets it wrong with English and you can't use that feature. Word wrap seems to be missing too, but I definitely suspect that it is there somewhere, just in an obscure place.

Text editors are good for entering text, but forget formatting. This program isn't something you could bash out letters on. Well you could, but they come out about as elegant as program listings.

There is a spelling checker, which was okay but not that intelligent, and a good virus/vector checking program called Vectacheck. As a text editor and alternative to ED and EDIT, it is first rate. But if you are trying to avoid buying a wordpro then I'd advise you to start saving and don't be such a cheapskate.

Value for money 36/100
Commercial value 2/10

Classix 2
(disk 798)

Clearly there was a *Classix 1* and this therefore has to be the second such collection of popular classical music programmed by Rob Baxter. The disk features such popular classical and baroque tunes as Handel's sinfonia *Arrival of the Queen of Sheba* and *Allegro Deciso* (from *The Water Music*); Bach's *Gavotte, Badinerie and Air (Air on a G String)* and *Brandenburg Concerto No. 5*; and everyone's favourite computer music tune, Pachelbel's ubiquitous *Canon and Gigue*.

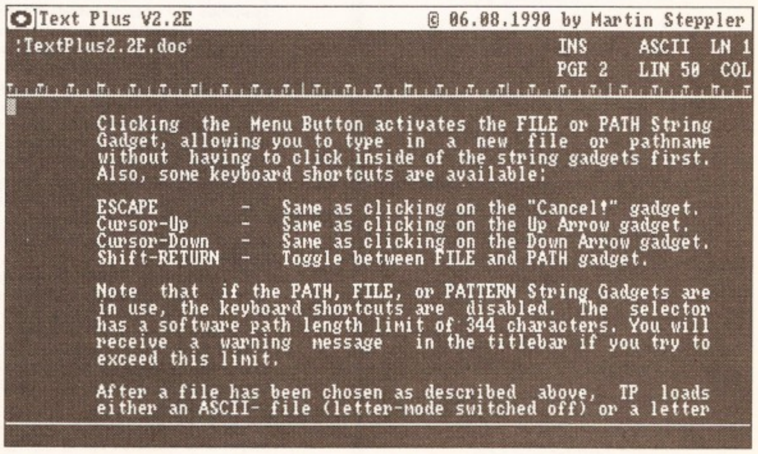
The tunes are all done using *Sonix* and *Synthia*. *Synthia* is used to create the synth sounds, which are then loaded into *Sonix* to play the tunes. All very well if you know musical notation, but a very difficult job if you don't. The renditions of all the tunes are very good, the sounds are very pleasant on the ear and are brilliantly synthesised. Rob has performed both tasks well and his work is particularly impressive as the creation of original sounds with *Synthia* is not at all easy. I've been a synthesist for around 10 years and I still can't wring anything meaningful out of the thing. So more power to your elbow Rob.

As a recent convert to the idea that baroque music can be a lot of fun, I found this collection to be very accurate and not a bad introduction to the classics. The sounds are evocative of the instruments of the day, but of course they have a more synthetic quality; not unlike Wendy (nee Walter) Carlos' *Switched On Bach*, or indeed anything at all by Tomita. It's also nice that you can load the sounds and the scores into *Sonix* and study how the whole feat was accomplished. So, great music and good educational too.

Value for money 75/100
Commercial value 3/10

Ratings' Weightings

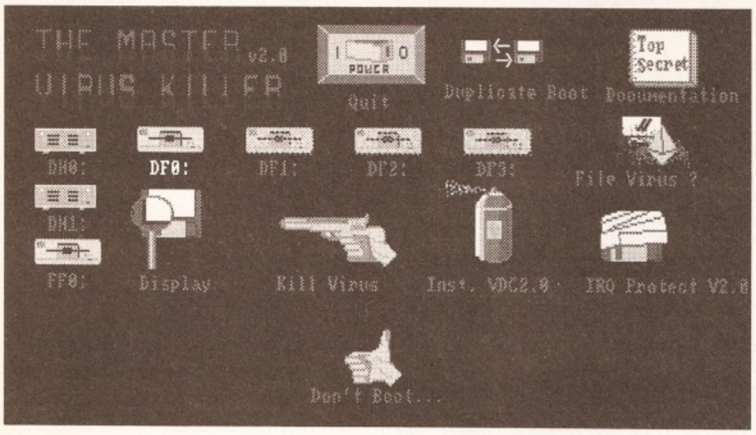
The ratings given indicate the program' value for money as a PD offering and its commercial value if it were sold as a full-price program.



Dokumentation ist sehr interesting mit this German offering, but the program's hyphenation suffers from longcompoundwords.

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If ever you have fallen victim to the sicko tricks of that sub-species of pond scum, the virus writer, you will appreciate *Master Virus Killer.*

Games (disk 640)

As I said earlier, although Amiganuts doesn't do games as a rule, it does do the odd disk of compact and addictive games. In the case of disk 640 the games are *Train*, *Roll On*, *Cross Fire*, *Tumbling Tots*, *Tron*, *Kamikaze Chess*, and *Air Traffic Control*. Most of the game titles give you the idea of what they they do, but here's a quick rundown of what you can look forward to:

Kamikaze Chess is the same as ordinary chess, except you have to lose. This is an original concept and one which I thought would be easy. I've been losing at chess for years, so I can do that without really trying. But what I forgot is that in *Kamikaze Chess* the other person is trying to lose too, and if they're a better chess player than you then they'll lose first. It has to be said that the computer is much better at losing than I ever was.

Tron is a fast and furious light cycle game, just like the game in Disney's *Tron* movie. But without Jeff Bridges. This is a very good version however, and you have more control over your bike than in many other versions I've seen, allowing you to cut people up by driving close to the walls. A nice piece of nostalgia but not very original.

Cross Fire is a violent *Pac Man* in which both you and some ghosts have automatic weapons and you must shoot all the ghosts before they shoot you. About ten seconds fun.

Roll On, a sort of *Boulderdash* clone, involves pushing or rolling rocks on to hot spots on the screen. The game is very hard to beat and requires a lot of thought before you start pushing rocks around. Even the hardest looking screen is possible, and it only takes about six weeks' lateral thinking before you can complete all the frames. There is also a screen editor for you to create tricky scenarios for your chums.

Train is a computerised train set in which you can fit the track together and play trains. I think this program didn't like the huge mounds of memory I have in my Ami, as it bugged out. Finally, when it worked, it was good fun to play around with. I think a Scalextric set would have been better though.

Tumbling Tots takes a sick humour to play. It involves bouncing babies off a fireman's net into an ambulance. If you miss them then you need a fish slice to get them off the floor. Urgh. Call the NSPCC.

Air Traffic Control is exactly what it says, and this version of the game features Amiga speech. It also has a similar problem with expansion memory that *Train* had, so make sure you turn the computer off and on again before you begin to play it.

The disk is good value and the games are all good fun and very playable too. Although some of the actual programs are a bit old and have doubtless appeared on numerous bulletin boards, the collection is balanced and is a creditable addition to your PD collection. A diverting game on the old hard disk never does any harm during those lazy moments at the keyboard. There's nothing I like better than a quick game of *Tron* before starting the day's toil.

Value for money 71/100
Commercial value 5/10

Master Virus Killer (disk 971)

This is a virus killing machine, written by Belgian coder Leclercq Xavier. (I wonder if he knows Nico Francois?) This is version 2 of the MVK and features the bootblocky particulars of 105 different viri, including some I've never even heard of, and recognises 47 different kinds of benign bootblocks, which means you don't get an alert from a non-violent block.

The MVK detects and erases virtually any virus, including IRQ type file viri which attach themselves to a file rather than the obvious bootblock hiding place. If it cannot detect and identify a virus, it will log it for future reference. An IRQ protector program can be put on your most sensitive disks, just to make sure they don't catch these horrid little bugs.

A lot of the docs are in French (presumably with a Belgian accent) although all the most important stuff is in English too. Could this be the start of a flood of Belgian coding crews? Are the Belgians coming? Nah, it's just a couple of guys, you know?

Value for money 82/100
Commercial value 9/10

continued on page 110

JARGON BUSTING

ADSR: Attack, Decay, Sustain and Release - a means of describing the changing volume of a sound with time, also known as an envelope. Attack determines how quickly the sound rises to maximum volume, then decay specifies the rate at which it falls to a level set by the sustain parameter. The sound continues at this volume until its is 'released' (analogous to taking your finger off a piano key), and the release parameter determines how quickly the sound fades to silence.

BOOTBLOCK: The first two sectors of an AmigaDOS disk located at track 1, side 0. The bootblock is used to describe the filing system in use and can contain a special program to 'boot' (load and execute from a reset) certain disks. This is how most simple viruses get into the system.

CLI: Command Line Interface - a program that provides a window into which AmigaDOS commands can be typed. Also known as the Shell, although the Shell offers a number of additional facilities over the CLI.

EXECUTABLE OBJECT: a file which can be loaded into the Amiga and run as a program, as opposed to a data file which requries another program to give it meaning.

IFF: Interchange File Format is a means by which data from different graphics or sound sampling programs are saved in a compatible way.

RAY-TRACE: A means of drawing a three dimensional picture where objects are specified as geometrical shapes with definable surface textures. Light sources can be placed at will in the imaginary area. The Amiga then draws the scene by tracing the possible straight-line paths of light from these sources to the objects and using the laws of optics to calculate refelctions and shadows.

SOUNDTRACKER/NOISETRACKER: Public domain programs that play back entered sequences of notes using digital sound samples.

game – notice the success of *Lemmings* from Psygnosis.

● Slide shows: Graphic artists spend a lot of time creating screens of graphics and making them into slide shows for your enjoyment. Some are scanned pictures, but most are drawn and accompanied by a nice bit of music. If you're clever you can grab the art and examine it to see how it was done, and with the permission of the author you can in most cases use it as clip art for your DTP packages. Some of the most stunning stuff comes from Tobias Richter of Germany. He uses a ray tracer called *Reflections* and turns out some amazing stills and animations.

● Music demos: Some authors are music nuts and they spend their lives churning out disks of tunes for you to play on your Amiga. Some are *Soundtracker* or *Noisetracker* sampled tunes from the charts. Others are synthesised tunes from the classics. Most are pretty good.

● Licenseware: These are programs that are licensed to specific PD houses to prevent their free distribution. At the end of the day, the price the consumer has to pay is pretty much the same.

● Disk magazines: Magazines on disk are not new, but there are more now than ever before. *Newsflash*, *17 Bit Update*, *Computer Lynx*, and *Jumpdisk* are prime examples of the type of thing I'm talking about, and they are all very good, usually containing PD software, demos and music, plus a lot of graphics and text. The text is usually reviews of software, or perhaps a bit of hardware, and usually quite short to keep the number of different text files up and leave space for programs.

If you haven't got a modem and access to a good BBS, then the

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187 Crusaders Audio X
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398 Powerlords: Power Musix 1
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424 Made in Heaven (2)
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713 Flash! - Queen (2)
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857 900 / Oxygene Remix *
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891 Creepshow
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MED v3.0
(disk 973)

If you are in the market for a music making program, then this could be the moment you've been waiting for, because *MED 3* is here. This is one of the best value PD programs on the market. As well as being a fine *Soundtracker* – type music program, it also allows you to sample, construct synth sounds and read and write *Soundtracker* files and modules.

This is version 3 of this popular program by Finnish coder, Teijo Kinunnen, and because of the size and perfection of the program, it comes out at a special price of £3.50. The program works using a series of pages of hi-fi-type transport controls, and the program uses two different methods of editing: the traditional tracker-type upward scrolling lists of numbers and a new, sideways scrolling score. Although this isn't a traditional blobs and bars type interface, it is easier to learn for musically talented but classically untrained beginners.

For tracker experts there is much to get your teeth into and you should be able to crack in right away and do some wicked music. There are demo tunes to run, plus a module from *Soundtracker* to help you along the way. When you play a tune, the four channels have hopping bar meters to show the notes, plus an oscilloscope display. You can also see a sort of fake spectrum analyser, so there's a lot to look at while the tunes are happening.

The sample editing is nicely done, with facilities in common with some of the top-end sample editor programs like Audiomaster. It is very easy to use and comes with a directory of ready made sounds for you to re-edit and make your own. All the ranging and mixing options are there for you to take the noise out of the sample and even add effects such as echo.

The synth editor is a similar affair to the sound editor you get in *Sonix*. The sounds seem to be naturally slanted to some of those funky old C64-type sounds. Not that there is anything basically wrong with C64 sounds; the SID chip was the best computer synth of all time in my view and I've heard some startling stuff on it. The best thing about synth sounds is that they are generally more expressive than samples, as they have an ADSR envelope and are more musical for that. Some of the bass sounds you can get through synthesis have a more gutsy quality than you would have, though possible, from chip music. The synth voices also take up a hell of a lot less room too, being based not on a chunk of memory but a tiny waveform and an ADSR envelope. So thumbs up for the synth section there.

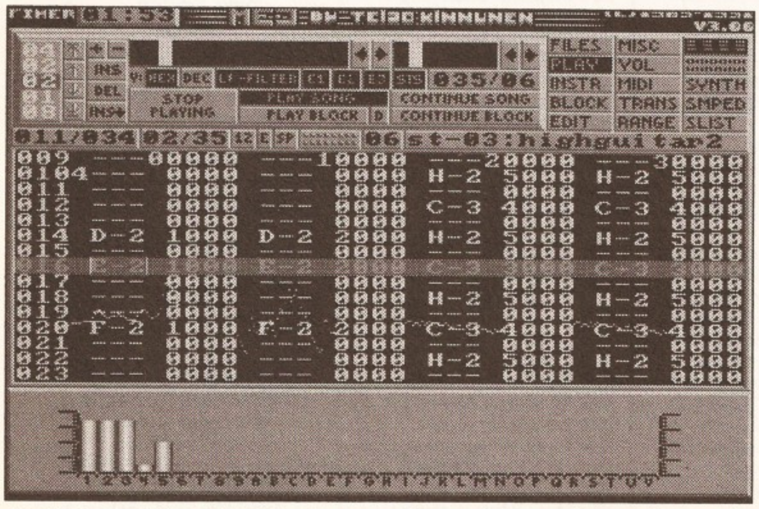
"There are a couple of very groovy programs for creating automatic menus for your demo disks"

Unlike *Soundtracker*, you are not limited to the numbered ST-xx sample disks and so you can load any old samples you've got around and use them to create beautiful music. And unlike the very unfriendly soundtrackers, it is easy to install on your hard disk. Just copy all the files from the disk onto DH0: or whatever and you're off. No stupid assigns to make, no nothing.

Another really classy thing about *MED* is its use of MIDI, allowing you to send or receive MIDI information on any MIDI channel, and even a load at once. One of the sample tunes on the disk outputs a sequence to a Roland U20 if you have one. If you haven't, I'm sure you can re-route it to some samples or to appropriate sounds on your own synth perhaps.

The really astonishing thing about *MED 3* is the sheer amount of stuff you can do with it, and as a music tracker it is second to none. Although *MED* is not shareware, I urge you to send a donation to the author if you buy and use it, just in recognition of the sheer work that's gone into writing and testing this program. By the way, if you send Amiganuts £2.00, you'll be sent a disk full of source code.

Value for money 100/100
Commercial value 10/10



Aspiring musicians should get a buzz, bleep, whoop and nywooing-sssh from Teijo Kinunnen's *MED 3*, a *Soundtracker*-type music maker.

Metallion's Utils
(disk 848)

Metallion is one of the famous Kefrens demo team, and here he is turning his attention to a bunch of hot utilities for any Power Amiga user.

NEWTOPAZ alters the system font by changing the look of Topaz 8. Also included on the disk is a selection of fonts for you to choose from, plus an editor to make your own. The fonts are saved in a generic RAW format, and the program can be added to your startup sequence to alter the font before anything is printed. This turns your system into the most totally customised thing around, as the topaz font is everywhere on programs and windows alike. Alter the shape of the system font and your computer starts to look really cool. This is something you can do on the A3000 and other newer Workbench 2 machines, but in the past it's been a fairly laborious and flaky process. Metallion fonts are stored in a tiny RAW data format that takes up a single file of just 768 bytes, as opposed to between 3000 to 7000 bytes for your average Amiga font.

There are also a couple of very groovy programs for creating automatic menus for your demo disks. The first one is *Powermenu*, which is demonstrated on the disk itself as the method by which you select the utilities. The menu is a starfield from which you can select your programs using the mouse. A strange floating copper bar follows the mouse, leaving a purple ghost image. Very impressive it looks too. The second program of this type is *Powerboot*, which does a similar job, but more simply, and installs the menu on the bootblock. It's damn good for large programs.

There are two font editor programs: one for 16x16 and one for 8x8. The fonts can be for the *NEWTOPAZ* program or for general use, as you can save the files in a variety of useful formats that are highly suitable for programmers and ordinary users alike.

Also on the disk are two other programs: *Window* and *QuickRAM*.

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PD Moneysavers

The range of Public Domain software is becoming increasingly bewildering. So every issue, at least five pages of AMIGA SHOPPER will be devoted to PD reviews. But even though PD is pretty cheap, we'll still be using our strict value-for-money judgements on every review.

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only way to get your PD is to spend money and buy some. But you thought I said PD was for free? Well PD is free, but disks, postage and the wages of the men who sit all day at the copying machine aren't, so be prepared to pay between 99p and about £2.50 per disk. The price you pay for your PD is up to you, although some people get a bit cross paying £2.50 when other houses do disks for 99p. I suppose it depends on where they buy their disks and from whom. Plus it depends how they duplicate their disks. If they have an office and a duping machine, then it costs money to run. But if they've built the PD house into an existing business or are a one man outfit anyway, then obviously they have no overheads to speak of. Either way, it's up to you. Some 99p houses are good, others are terrible. The only way to find out for sure is to spend 99p. Or read *Amiga Shopper* every month.

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Window allows you to select the kind of window you'd like to see on screen and executes it right away. Type it in and BANG, it's there. And *QuickRAM* copies some system files into RAM giving you a very quick startup disk. All you do is assign C: to RAM: and you're off. This is a great utils disk and gives surprisingly stable results for a bit of PD techy stuff. But then again the Kefrens mob are well known for their hot stuff, as they will doubtless tell you given even half a chance!

Value for money 79/100
Commercial value 4/10

A-Gene
(disk 933)

This is a genealogy program, which is basically a highly specialised database on which to plot your family tree. Into the program you enter all your family data, like who married who and when people were born, then cross-reference everyone. You are then able to produce reports based on the data. The kind of reports I'm talking about are like flowcharts, with you at one end and your oldest known rellie at the other. We're talking ancestors here, so get talking to your granny, and see if she knows anything more than she's saying. Perhaps you're related to a famous historical figure?

Be warned, this is just a limited version of the program. To get a full two-disk version you have to mail off £15 to the author in Australia. The full version is very comprehensive, coping with 2000 people and 500 marriages. Not only that, you can have a separate disk full of digitised pictures too, so you end up with a huge multimedia family tree. But don't forget, you will spend most of the next two years of your life either typing in information or down Somerset House (or wherever the Dickens that place is where they keep the records) looking stuff up.

Even though you need the full program to get really professional, the limited version is enough to get a tree going on a fairly casual basis and the program works fast too. Personally I'd rather give the fifteen nicker to some bod to look up the births'n'marriages for me. But then I'm the kind of bloke who uses a remote control on his car stereo, so take no notice.

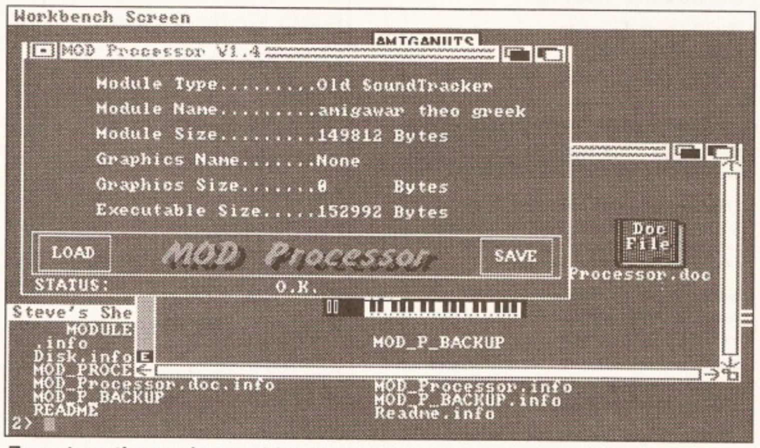
Value for money 82/100
Commercial value 7/10

Juggler 2
(disk 913) 1 Mb

This animation is the only demo I was sent, and it's a joke on one of the earliest demos for the Amiga. In the beginning there was *Boing!*, which was a huge red and white checkered ball bouncing around in a grey room. (Trivia point: 'twas rumoured that one of the Amiga system programmers banged his garage door to get the boing noise.) Then after *Boing!* came the *Juggler*. Now old *Juggles* was the very first ray-traced image on an Amiga, and the first animated ray-traced demo too. The juggler stood in the by now familiar chequered landscape, juggling a trio of mirrored balls. It was really stunning at the time and sold far more Amigas than *Boing!* did, I can tell you.

Now it's the 1990s, and *Juggler 2* arrives. It's a Moviesetter cartoon, starring our old friend from the *Juggler*, plus a new friend of his. I won't spoil it by telling you what happens, but it's very funny.

Value for money 51/100
Commercial value 2/10



Forget routine and use a bit of musical intuition to demo till you drop. *Mod Proc* enables you to replay tunes and pix without getting strung out.

Module Processor
(disk 864)

This is the new version of *MOD2EXE* by Steve Marshall. It differs from the old version in many ways, not least of which is the way it does the job via an Intuition interface rather than from the CLI like the last version.

With it you can load almost any module from a tracker and turn into an executable object. You can save it just as a program, or a program with an icon, or a program with an icon and an IFF picture. This means that you can create an icon on the desktop which, when double-clicked, fills the screen with a picture of your own creation and then plays your tune; ideal for making a quick, one-off demo tune for all those disk magazines crying out for brilliant art and music, eh? It's also a bit good for doing intros to your games or demos. All you do is create a file with an IFF attached and put the name of the tune in your startup sequence. Piece o'cake.

The trackers it supports are *Old* and *New Soundtracker*, *Noisetracker*, Brian's *SoundMon*, *MED*, *Musical Enlightenment*, and *Game Music Creator*, which I think covers all the bases. *Mod Proc* is a very clever and simple util, and if you like to generate music then this is one way to show it to everyone else without having to know how to code a play routine.

Value for money 82/100
Commercial value 8/10

Shopping List

Amiganuts United disks are generally priced between £1.50 and £2.50 each (including post and packing), £4 for two-disk sets and £5 for three-disk sets. MED v3.0 (disk 973) is priced at £3.50.

For further information and a catalogue contact:
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Issue 2 of *Amiga Shopper* is on sale on May 2 and you simply can't afford to miss it. Special features include comparisons of all 2D paint programs and a close look at programming languages. All the regular columns you've been introduced to this month will once again be featured, bringing you news, reviews and features on the area of Amiga computing that you're interested in.

If you were impressed by this issue, and we hope you were, then you ain't seen nothing yet. If you want to stay in touch with the world of Amigas then make sure you get issue 2 of *Amiga Shopper*.

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All the latest news and product information.

ProFlight takes off!

ProFlight, the extremely accurate and flyable Tornado flight simulator from HiSoft, is due for release on the Amiga by the end of May 1991.



First released on the Atari ST where it has won a high degree of critical acclaim from reviewers and users alike, ProFlight is not only one of the most technically realistic simulators around but it is also tremendous fun to fly.

You can fly peaceful reconnaissance missions or roar into attack after carefully planning your combat mission. ProFlight is supplied with a comprehensive, ring-bound flight manual for an all-inclusive price of £39.95.

SAS C5

SAS Institute (the parent company of Lattice Inc.) has taken over the development and sales of the Lattice C 5 compiler for the Amiga and released a new version, 5.10a.

The improvements and enhancements in this version establish SAS C5 as the ultimate Amiga C compiler. Upgrades cost £34.95 (ver. 5.0x), £79 (ver. 4.xx) or £99 (ver. 3.xx).

Pascal at last!



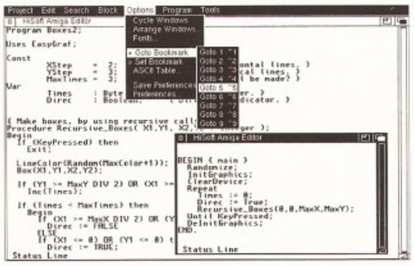
A brand-new version of the popular Pascal language will be available soon for the Amiga (A500 - A3000).

HighSpeed Pascal originally comes from Denmark, (the 'home' of Turbo Pascal), is extremely fast and friendly to use and is very closely compatible to the immensely popular Turbo Pascal on the PC.

Compilation speed is roughly 20,000 lines per minute on an A500 with excellent code generation for all the Amiga computers.

HiSoft is developing the package along with the original authors, D-House. Some of the features of this exciting new compiler are:

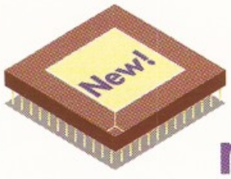
- Compile to memory or disk
- Unit concept as in TP5 allowing modular development and very fast compilation. Many standard Amiga-specific and Turbo Pascal compatible units are supplied
- Stand-alone compiler supplied. Multi-standard linker. Versatile Make facility
- Source include to a depth of 7
- Inline procedures. Source code control using conditional compilation



The HighSpeed Pascal Editor

- Integrated, multi-window editor with on-line help and interactive error detection and correction
- Numerous examples and helpful manual

HighSpeed Pascal should be available by the end of May 1991 at an inclusive cost of £99.95.



More and more...

In addition to ProFlight and HighSpeed Pascal HiSoft is set to release a number of other new products for the Amiga in early 1991, showing our increasing committment to the Amiga range of computers. To whet your appetite:

HiSoft C Interpreter

The ideal way to learn the difficult C language, HiSoft C is an interpreter with a fully integrated editor and debugger. Release is due by the end of June 1991 at a price of £49.95.

HiSoft Inspiration

This exciting new product makes it simple to design and use the Amiga's gadgets, requesters etc. in your favourite programming language. Release date is the end of March 1991.

Devpac and BASIC

HiSoft Devpac version 3 and HiSoft BASIC version 2 are due out in the first half of 1991. Both feature a brand new, multi-window editor, much more speed and a great many new features. Tick the box(es) below for details.

Meanwhile, we have some very special offers on our existing products - use the order form below (you can photocopy it if you wish). Devpac 2 and BASIC 1.05 contain coupons offering you the chance to upgrade to Devpac 3 or BASIC 2 for £35 and £45 respectively.

Use this order form to obtain your HiSoft Software directly from HiSoft and we will send you a Starter Pack consisting of a quality mouse mat (printed with the Amiga ASCII set), an attractive disk wallet and 4 double-sided disks, totally free of charge!

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- ☐ HiSoft BASIC ver 1.05 £49.95
- ☐ HiSoft Extend Library £19.95
- ☐ HiSoft BASIC & Extend £59.95
- ☐ SAS / Lattice C 5 £229.00

Please send me information on:

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- ☐ HiSoft Inspiration
- ☐ HighSpeed Pascal
- ☐ HiSoft C Interpreter
- ☐ HiSoft BASIC 2
- ☐ HiSoft Devpac 3 / HiSoft Devpac 30

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HiSoft software is available from good computer shops. In case of difficulty, you can order directly from HiSoft, either by using the order form opposite or by telephone. For export terms or further details on any of our products, please call or write to us. Prices are inclusive of VAT and carriage within the UK.

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